SOUTHERN POWER AND INDUSTRY

NOVEMBER, 1955

BULLETIN BOARD FOR SOUTHERN INDUSTRY

Products and engineering services of leading Southern and Southwestern manufacturers are highlighted in this issue.

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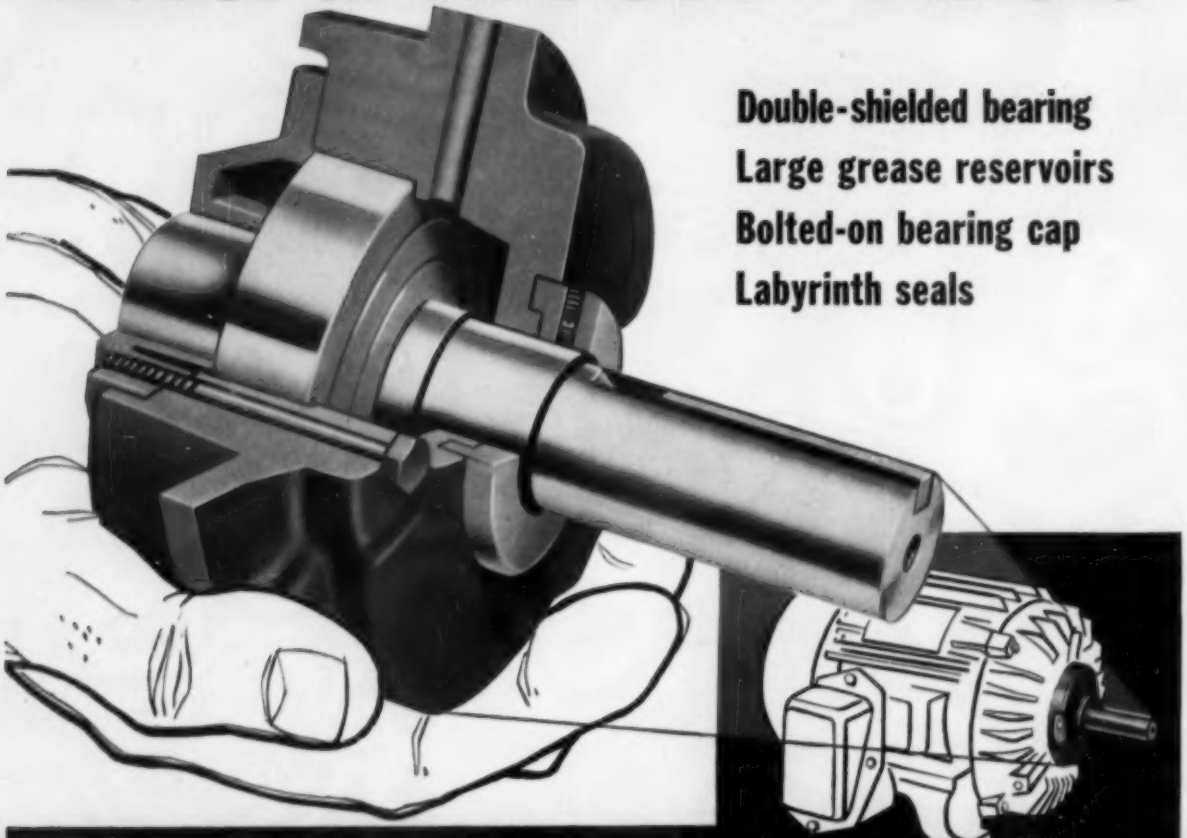
Here Is Extra Motor Value



Double-shielded bearing
Large grease reservoirs
Bolted-on bearing cap
Labyrinth seals

This Allis-Chalmers Bearing Design Gives More for Your Motor Dollar

The bearing cap is held tightly in place against the inner face of the bearing enclosure. This cap, with its close running clearances, keeps grease from the interior of the motor . . . retains an ample supply within the bearing enclosure.

At the outer side of the bearing, double labyrinth seals keep grease in, also keep dirt out. What's more, large grease reservoirs act as additional dirt traps.

You can lubricate these bearings without dismantling motor. Pipe-tapped holes in the bearing housings at two points provide means for inserting new grease, flushing out old grease and of relieving pressure during re-greasing.

Look for the extra bolts on the end housing . . . the sign of greater value. Ask your Allis-Chalmers representative or Authorized Distributor to show you a cutaway section of this maintenance-cutting design. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 51B7225.

A-4614

ALLIS-CHALMERS

SOUTHERN POWER & INDUSTRY is published monthly at 56th & Chestnut Sts., Philadelphia 39, Pa., by W. R. C. Smith Publishing Co.
Executive and Editorial Offices: 806 Peachtree St., N. E., Atlanta 5, Ga. Entered as second-class matter at the Post Office, Philadelphia, Pa.
Subscription Rates: United States and Possessions, $1.00 per year or three years for $2.00; Foreign Countries, $10.00 per year.

Volume 73 Number 11

New self-feeding, non-plugging materials handling valves

give trouble-free flow control in the pneumatic transport of fine solid materials

No plugging of transport piping systems. A-S-H Type C Materials Handling Valves eliminate headaches that used to plague power engineers in the handling of fly ash and other fine solids. Type C Valves offer tne following advantages:

Self-feeding—Atmospheric air, admitted into the vacuum system through inlet ports, continuously picks up and carries materials from the valve into the transport piping.

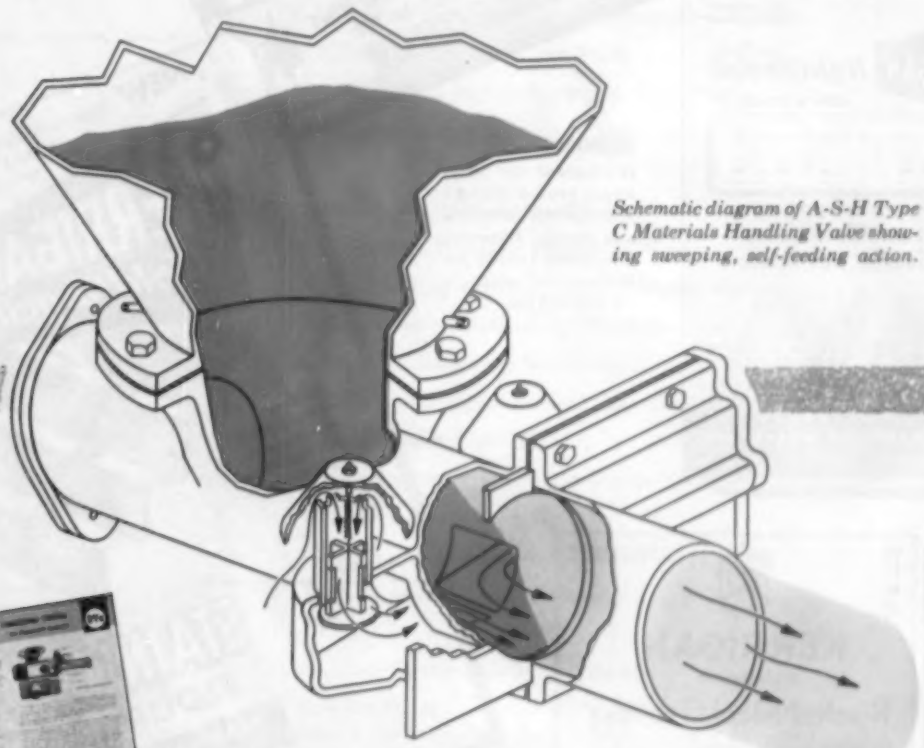
Non-plugging operation—Continuous rate of feeding, commensurate with the increases and decreases of the load, eliminates plugging and the need for periodic closing of the valve to unplug the system.

Positive shut-off—Sliding gate mechanism uses vacuum in the system to keep gate slide clear . . . and to hold gate tightly against seat when valve is closed.

Maximum carrying capacity—High vacuum results in high material concentration and permits use of smaller diameter transport piping.

Minimum frictional wear—Bulk of material, at maximum concentration over full area of pipe, avoids contact with pipe walls, thus eliminating sandblasting effect of low material concentrations.

Ease of maintenance and operation—Valve can be maintained while system is in operation. A turn of a nut adjusts air inlet port openings to accommodate different materials and draft conditions. Type C valves are designed for air-electric, remote and manual operation. A post card requesting information on A-S-H Type C materials handling valves will bring you complete technical data promptly.



Schematic diagram of A-S-H Type C Materials Handling Valve showing sweeping, self-feeding action.

Write for your copy of Data Sheet DVa.

The **Allen-Sherman-Hoff** Company

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spark-proof for those whose need is strength AND lightness. Extra safe and strong. Allowable fiber stress 15,000 psi. Modulus of elasticity 10,000,000 psi.

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SOUTHERN POWER AND INDUSTRY

Vol. 73
No. 11

NOVEMBER, 1955

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Annual Subscription—$1.00
Foreign—$10.00

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Published monthly by
W. R. C. SMITH PUB. CO.
Atlanta, Ga., and Philadelphia, Pa.

Publishers also of *Textile Industries, Electrical South, Southern Hardware, Southern Automotive Journal, Southern Building Supplies, and Southern Appliances.*

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Contents indexed regularly by Engineering Index, Inc.

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Editorial and Executive Offices: SOUTHERN POWER & INDUSTRY, 806 PEACHTREE ST., N. E. ATLANTA 5, GEORGIA

Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

November, 1955

► UNDERGROUND CABLE is very important at the Oerlikon Tool & Arms Corporation plant near Asheville, N. C. Almost isolated as the plant is from densely populated areas, its manufacture of nitroglycerine, explosive propellants for rockets and their attendant ignition devices and assemblies can be carried on with the very minimum of danger.

Electrically, the installation is quite unique in that all primary and secondary distribution is underground, with the exception of the incoming hi-line to the substation. In this issue of SP&I, Robert U. Garrett, Chief Electrician of the Oerlikon organization, describes loop distribution, substations, secondary distribution, grounding, and safety precautions.

► ALUMINUM RAINBOW--Right now you can order aluminum sheet, extruded shapes, rod, bar, and drawn and extruded tube in blue, green, yellow, gray, brown, gold and black metallic finishes. Shade variations of the standard colors can also be made available. It is an Alcoa development.

Two general classes of color anodized finishes are involved--Alcoa's Decorative Color Finish, designed for both interior and exterior application; and Alcoa's Architectural Color Finish, designed primarily for hard-weathering exterior service.

In the past most colored aluminum was batch-finished independently after the sheet or extruded shapes had been purchased from the mill. Now, a fabricator can order his color product direct.

► THE "STAINLESS" OF PLASTIC PIPE--polyvinyl chloride--being produced by several manufacturers, is recognized for its excellent chemical resistance. It resists attack by acids, alkalies, salt solutions, alcohols, and most chemicals. It is non-toxic and will not impart foreign tastes or odors to liquids used for human consumption.

Ease of installation is another advantage emphasized by the National Tube Diviison of U. S. Steel. Twenty feet of the 2-in. standard PVC pipe, for example, weigh less than 13 lb. Fittings can be quickly applied by heat welding, solvent-cementing, threading or adhesives. Because it is rigid, the lightweight pipe can be installed overhead with regular pipe supports.

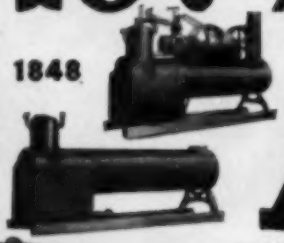
PVC plastic pipe has proven to be excellent for immediate applications in the piping field--crude oil pipe lines, salt water disposal lines, chemical plant piping, industrial cold water lines, and vent pipes, particularly for the removal of acid fumes and corrosive gases.

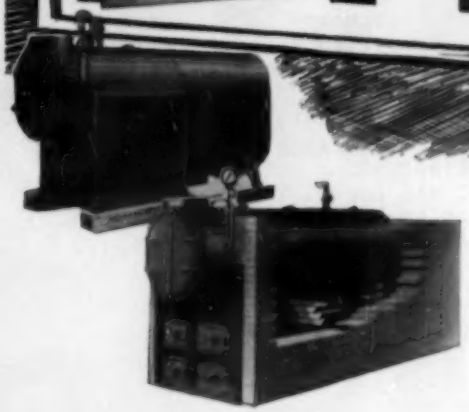
► VOLTAGE REGULATOR INSTALLATIONS have afforded better testing and fewer manufacturing rejections at General Electric's electronic tube manufacturing plant. Inductrols (G-E dry-type, induction voltage regulators) were added to the circuits that supply the test area.

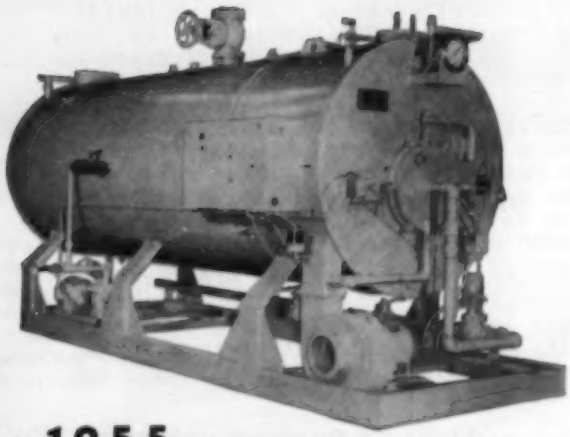
The regulators keep the heater supply voltage constant on the test racks. The tubes are, therefore, tested under identical voltage conditions. Defective tubes are quickly discovered. Also, the rejection of good tubes due to poor performance under poor voltage conditions is eliminated.

(Continued on page 6)

107 YEARS of RELIABILITY ARE BEHIND EVERY AMESTEAM GENERATOR







1955

In your selection of a boiler, it's important to remember — experience *does* count. And what better assurance of top boiler quality do you have than the Ames record: 107 years of building fine boilers — boilers which have given economical, satisfactory service throughout the industry! Many Ames units purchased 40 to 50 years ago are still faithfully on the job. Amesteam Generators always incorporate the latest advances in package boiler design.

Write today for details on these boilers with the proven record of reliability.

AMESTEAM GENERATOR

20 sizes, 10 to 600 H.P., 15 to 200# W.P., oil, gas, or oil-gas combinations with quick fuel switchover feature.

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Box I-115, Oswego, N. Y.

Show me how I can benefit from Ames experience and nation-wide organization in getting a top boiler value.

NAME .....

ADDRESS .....

COMPANY .....

Facts and trends (*continued from page 4*)

► INSTRUMENT INVENTORY SYSTEM--At Orange, Texas, du Pont's Sabine River Works, has for four years, used a manual system of maintenance and inventory control, in which data were gathered from the field and transcribed by hand to individual sheets in a Kardex file.

Although such a system was very workable and has served a very useful purpose, it was found to have certain limitations, particularly in the coordination of information for composite analysis. The system also lacked flexibility for mass accumulation of data for analyzing various difficulties.

The Texas plant has now converted the entire inventory system to an IBM card punch system. How it works, what is being done with the system and advantages are highlighted in this issue by A. V. Novak of the du Pont organization in Orange, Texas.

► FIRST NUCLEAR-GENERATING STATION erected in the Washington area and one of the first in the country to go into regular operation, will be built at Ft. Belvoir, Va., during 1956 and will be placed in service early in 1957. The Army Package Power Reactor will be designed and built by Alco Products, Inc.

► PLUGGING LEAKING TUBES in condensers and heat exchangers is a common problem in the chemical and petroleum industry. Tubes have been sealed by plugging with wood, solid steel plugs with a seal weld or replacing rolled tubes.

Monsanto Chemical Company's J. F. Queeny Plant in St. Louis, Mo., solved the problem with a two piece tapered tube plug (Elliott Company), which provides an economical and time saving method of plugging tubes ½ in. O.D. through 1 in. O.D. all gages. The tapered plug is also very useful for plugging tubes in experimental work where it is required that removal of the plug not damage welded or rolled tubes.

► LOG STACKER DELUXE--At the Rome Kraft Company mill in Rome, Georgia, a log stacker 300 ft long, rising 80 ft in the air at the discharge end carries pulp wood to storage. Movable end travels on a track in a 172 degree arc for approximately 570 ft.

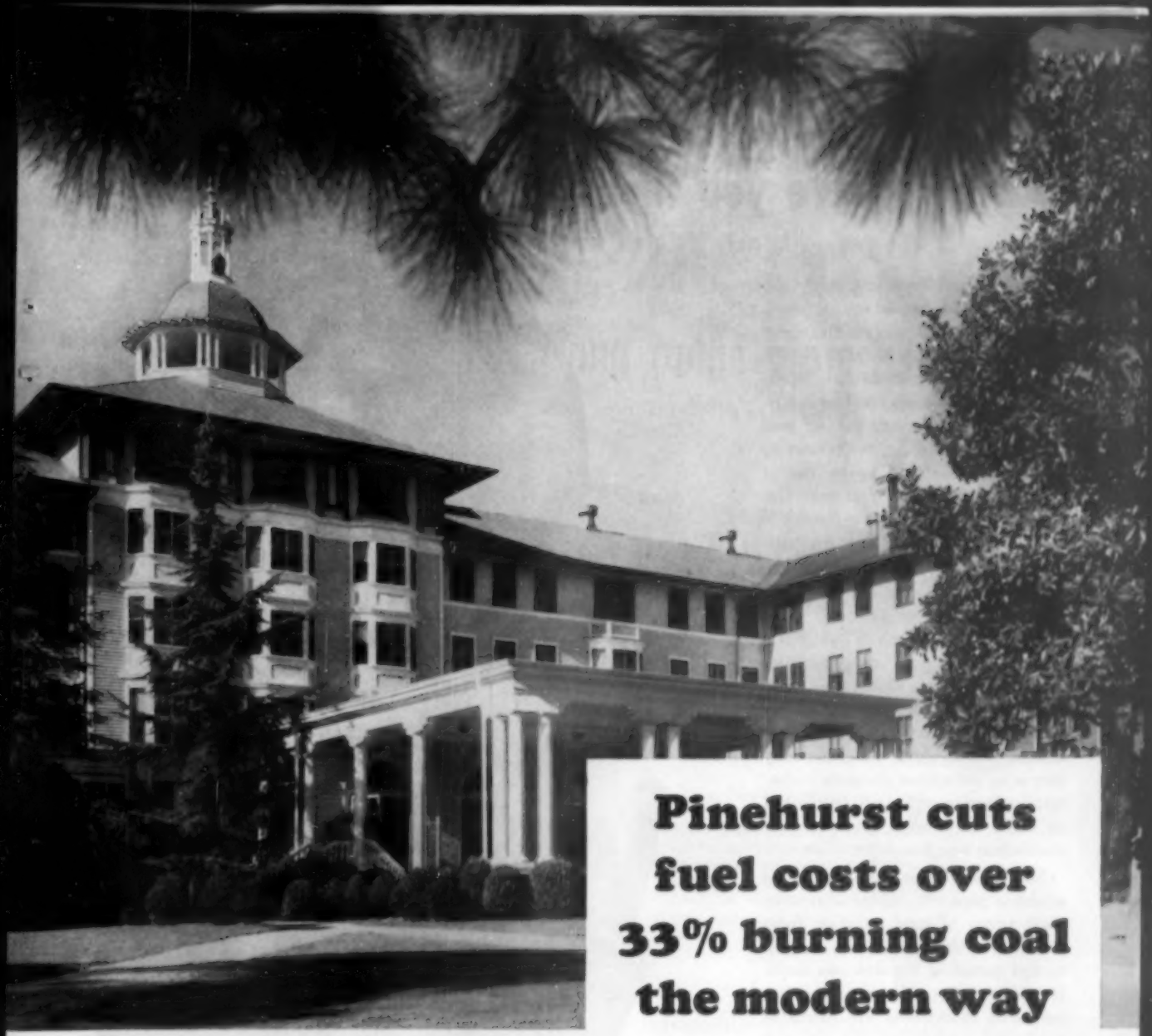
► SPEEDY COMMUNICATIONS--Chemstrand Corporation's Pensacola, Florida, nylon plant has employed Western Union's Intra-Fax Facsimile communications system in its quality control program. Equipment rapidly transmits chemical analysis data from the central laboratory to various control rooms throughout the plant area. System can reproduce typewritten messages, hand-written messages and sketches.

► ALUMINUM SHEATHED CABLES for electrically insulated conductors should find wide application in generating and industrial plants. At the recent A.I.E.E. Fall Meeting, an Okonite Company engineer said "that the gain in mechanical ruggedness over the ordinary lead covered or nonmetallic finished cables is so pronounced that it is clear there is no need to protect it with conduit or additional armor."

Steam plants are increasing in boiler temperatures and pressures and many industrial manufacturing processes have high ambient temperatures, creating a hazard to rubber insulation, aggravated by chemicals, deleterious to conduits. The silicone rubber-insulated, aluminum-sheathed cable provides a practical solution to this problem.

► $$$ FOR YOUR IDEAS — Send your ideas, methods and short-cuts to SP&I. Payment is made for suitable material — a photo or rough sketch will make your idea more valuable. Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

Write the editors for additional information on any of the above items. SOUTHERN POWER & INDUSTRY. 806 Peachtree St., N.E. Atlanta 5, Ga.



Pinehurst cuts fuel costs over 33% burning coal the modern way

The central power plant at the famous golfing resort of Pinehurst, N.C., has to furnish a reliable supply of steam to three hotels and seven other buildings. When Pinehurst recently decided to modernize power facilities, the consulting firm of Wiley and Wilson, Richmond, Va., was called in to study the situation. Since coal cost approximately 40% less than the next cheapest fuel, the final decision called for burning coal the modern way. Today two new automatic stoker-fired boilers (only one of which is operated at a time) replace four 150-hp hand-fired boilers. Combustion control is automatic; coal and ash handling is greatly simplified. And now, according to management, "the cost of generating steam is 33.4% less than with the old plant." For further information or additional case histories showing how other plants have saved money burning coal, write to the address below.

NATIONAL COAL ASSOCIATION
Southern Building, Washington 5, D. C.

Consult an engineering firm

Designing and building hundreds of heating and power installations a year, qualified engineering firms can bring you the latest knowledge of fuel costs and equipment. If you are planning the construction of new heating or power facilities—or the remodeling of an existing installation—one of these concerns will work closely with your own engineering department to effect substantial savings not only in efficiency but in fuel economy over the years.

facts you should know about coal

In most industrial areas, bituminous coal is the lowest-cost fuel available. • Up-to-date coal burning equipment can give you 10% to 40% more steam per dollar. • Automatic coal and ash handling systems can cut your labor cost to a minimum. Coal is the safest fuel to store and use. • No smoke or dust problems when coal is burned with modern equipment. • Between America's vast coal reserves and mechanized coal production methods, you can count on coal being plentiful and its price remaining stable.

It doesn't cost a cent to get advice that may save you thousands of dollars

I'M a National Tube engineer. One of the most important duties I have is to see that you get the right pipe or tubing analysis called for by your particular installation. Sure, you can use stainless steel or costly alloys for almost every job—if you don't mind throwing away money. But that's foolish, of course. You're trying to *save* money. You want the best tubing for the job—at the minimum cost to you. Okay—that's where I come in.

The next time you're in the market for tubing, get in touch with National Tube before you buy. We'll be glad to look over your specifications and to recommend the most suitable material for the job, at the lowest cost to you. We never lose sight of the fact that every installation is an individual problem in material selection and must be treated as such. Incidentally, our recommendation won't cost you a cent.

National Tube manufactures seamless pipe and tubing in a complete range of steel analyses from low carbon, through the alloys on up to and including the stainless steels. In addition, the widest range of sizes and wall thicknesses are available for every mechanical and pressure purpose.

NATIONAL TUBE DIVISION
UNITED STATES STEEL CORPORATION
PITTSBURGH, PA.
(Tubing Specialties)
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS NATIONAL *Seamless* PIPE AND TUBES

UNITED STATES STEEL

Georgia Power Company looks ahead—

selects GULFCREST OIL for long range protection

Georgia Power Company's Yates Plant at Newnan, Georgia, has three 100,000 KW General Electric Turbines in operation and is adding a fourth, which will be a 125,000 KW unit. 3,450 gallons of Gulfcrest Oil in each of the lubrication systems provide safe, sure, long-lasting protection.

Gulfcrest Oil has been in service at the Yates Plant of Georgia Power since 1950. Turbine systems are clean, there is no rust, sludge, or foam. But this is only the beginning. Gulfcrest will provide safe, sure protection for many years to come. (Gulfcrest has been in continuous service in several large turbines for over 20 years.)

There are good reasons for Gulfcrest's recognition as the world's finest turbine oil. Carefully selected crude oils are thoroughly refined, then super-refined by Gulf's exclusive Alchlor Process. This removes the unstable hydrocarbons that accelerate oxidation, form sludge and harmful acids. Then the right additives are properly combined, and you have a turbine oil that delivers superior performance in every type of steam turbo-generator.

A trained, experienced lubrication expert—the Gulf Sales Engineer—is as near as your telephone. Have him recommend the right grade of Gulfcrest for your turbines. Consult the telephone directory for the number of your local Gulf office.

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THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

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1822 GULF BUILDING, PITTSBURGH 30, PA.

NEWS *for the South and Southwest*

Public Utilities Association of Virginias Elects New Officers

New officers of the **Public Utilities Association of the Virginias** were elected at the organization's 37th Annual Meeting at White Sulphur Springs, W. Va. Left to right, they are **John C. Parrott**, president, Roanoke Gas Company, Roanoke, Va., who was elected second vice president of the association; **J. D. Murray**, assistant system office manager, Appalachian Electric Power Company, Roanoke, Va., elected association assistant treasurer; **Don B. Potter**, administrative vice president Monongahela Power Company, Fairmont, W. Va., who is the new association president; **A. J. Bowen**, division manager, Northern Virginia Power Company, Winchester, Va., the organization's retiring president; **William J. Stewart**, assistant general manager, Wheeling Electric Company, Wheeling, W. Va., who was elected first vice president of the association; and **W. F. Keehne**, system office manager, Appalachian Electric Power Company, Roanoke, Va., elected treasurer.

Reelected but not present when the picture was made was secretary **R. W. McKinnon**, Roanoke, Va. The association is composed of electric and gas companies in Virginia and West Virginia.

Distribution Transformers Being Shipped From New A-C Alabama Manufacturing Plant

The first shipment of distribution transformers from ALLIS-CHALMERS new transformer manufacturing facilities at Gadsden, Alabama, left Sept. 21 for the Alabama Power Co. The new facility becomes the fourth Allis-Chalmers transformer manufacturing plant, augmenting production at Milwaukee, Pittsburgh and Terre Haute.

The new production layout has been added in anticipation of a continually increasing need for electrical equipment in the South where capital expenditures for industrial, commercial and residential construction have been on the upswing for some time.

The new plant is a sincere indication of faith and confidence in this rapidly-growing industrial area. The Gadsden location was selected because of its geographical location, its experienced workers, its abundant natural resources, fuels and electric power.

The general manager of Gadsden Works, S. W. OUWENEEL, said, "The

Shown looking over the coil assembly for one of the first 15 Kva distribution transformers at the **Allis-Chalmers** new transformer plant at Gadsden, Alabama, are **R. L. Harris**—manager of electrical operations Alabama Power Co., Birmingham, **J. W. McMullen**, vice president and general manager in charge of power equipment division, Allis-Chalmers, and **O. K. Seyforth**, vice president in charge, Eastern Division, Alabama Power Co., Anniston, Georgia.

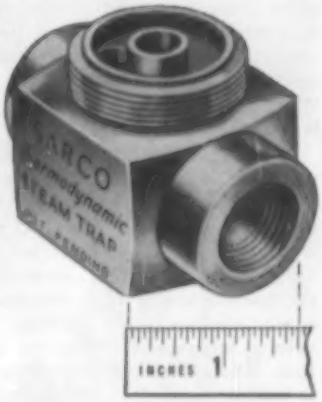
Now — A Revolutionary NEW Steam Trap!

What could be simpler?

1. A CAP

2. A DISC

3. A BODY



That's all!

Practically Eliminates Maintenance!

Look at this revolutionary new thermodynamic steam trap. Could it possibly be simpler? Look for the valve closing mechanism—there isn't any! The kinetic energy of steam closes the valve and *only* the TD uses this new operating principle.

Only 3 parts ... cap, disc and body ... machined from stainless steel bar stock ... all extremely simple, rugged, durable. Only one moving part ... a hardened SOLID stainless steel disc ... practically wear-proof.

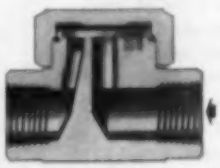
Just imagine how much time and expense this new TD steam trap can save you by greatly reducing and simplifying trap maintenance and inventory!

SOME OF MANY OTHER ADVANTAGES:

1. Use the same trap for 10-600 psi ... for light or heavy loads ... without seat or valve change or other adjustments.
2. Closes tight on no load — no steam waste.
3. Operates against back pressures up to 50% of inlet pressure.
4. Not affected by superheat, water-hammer, corrosive condensate.
5. Only one spare part—solid stainless steel disc.

TROUBLE-FREE DESIGN

No valve-closing mechanism to wear or stick—the kinetic energy of steam closes the valve. No critical clearances to choke. No gaskets to leak. Only one moving part—a SOLID stainless steel disc.



Ask for a 60 day trial installation of Sarco TD trap and strainer ... write for bulletin 257. Sarco Co., Inc., Empire State Bldg., New York 1, N. Y.

SARCO

8140-B

Only Sarco Makes All 5 Types

That's why Sarco can give impartial advice on proper steam trap selection.

Thermodynamic Steam Traps

Thermostatic Steam Traps

Float Thermostatic Steam Traps

Liquid Expansion Steam Traps

Camlift Bucket Steam Traps

production of distribution transformers will complement our agricultural equipment production and provide the diversity we have been anxious to achieve."

Gadsden Works is initially scheduled to produce the most popular ratings of distribution transformers, with plans to extend the range as conditions demand.

Transformers will be shipped to warehousing points strategically located throughout eleven states in the Southeast and Southwest areas for utility, commercial and industrial requirements. The plant itself is centrally located in relation to this market.

Transformers at Gadsden Works will be manufactured and tested with some of the newest and most modern equipment available. The plant property consists of 335 acres, with 318,698 sq ft under roof. Included are the manufacturing area, warehousing space, administration building, engineering laboratory, and utility buildings. The large area devoted to construction of distribution transformers is completely air conditioned and includes a very modern industrial lighting layout.

Haswell of T.C.I. Retires

The retirement of ARTHUR B. HASWELL as vice president-engineering of the TENNESSEE COAL & IRON DIVISION of United States Steel Corporation was recently announced, and NORMAN C. MICHELS is his successor as TCI engineering vice president.

Cone-Drive Gears—N. C.

The appointment of CROSS SALES & ENGINEERING COMPANY, Greensboro, N. C., as sales engineering representatives for CONE-DRIVE GEARS, Division of Michigan Tool Company, Detroit, Michigan, was recently announced.

Included in the Cone-Drive double-enveloping worm gear line are standard, shaft-mounted and motorized speed reducers; gearsets; couplings and allied accessories.

Cross Sales & Engineering will cover the states of North Carolina, South Carolina, Virginia and West Virginia. They will also act as a stocking jobber for the same territory.

L. B. Foster Co.—Atlanta

L. B. FOSTER COMPANY has enlarged its new Atlanta office sales staff with the addition of ERSKINE FRASER as sales representative. He will handle sales of Foster steel sheet piling, pipe piling, steel pipe, rail and track accessories in the southeastern states.

Erskine Fraser

Foster's Southeastern office was established in Atlanta this summer under the direction of Paul Duke, a graduate engineer from Georgia Tech formerly associated with the Atlantic Steel Company. Harold Ford is also assisting Mr. Duke in sales activities.

L. B. Foster Company's office at 805 Peachtree St., N. E., Atlanta, Ga., serves Alabama, Florida, Georgia, North Carolina, South Carolina and Tennessee.

York-Shipley Southern Distributors

Distributors for ALABAMA, GEORGIA and TENNESSEE have been appointed by the industrial division of YORK-SHIPLEY, INC. for its lines of packaged steam generators, rotary burners, factory-coordinated boiler-burner units of Scotch and firebox types and factory-coordinated industrial fuel-burning and feedwater systems.

S. C. BRATTON SALES ENGINEERS LTD., NORTH BIRMINGHAM, will handle the full York-Shipley line for Alabama. C. H. BUCK will direct the sales.

The STROMQUIST CO., ATLANTA, will handle York-Shipley steam generators, rotary burners and factory-coordinated systems for GEORGIA. B. STROMQUIST and LOUIS COOK will direct sales.

TENNESSEE HEATING CO., KNOXVILLE, TENN., will handle the full York-Shipley line for the KNOXVILLE, CHATTANOOGA AND NASHVILLE trading areas. R. A. SEEPE and WILLIAM DALTON will direct the sales.

Resistoflex—Kansas City

WILLIAM SPANGLER has been appointed head of a newly established Kansas City sales office of the RESISTOFLEX CORPORATION, Belleville, New Jersey, manufacturer of specially engineered flexible hose assemblies and plastic materials for the aircraft and other industries.

FUTURE EVENTS
Of Engineering Interest

INSTRUMENTATION CONFERENCE, Louisiana Polytechnic Institute, Ruston, Louisiana.
Nov. 3-4, 4th Annual Instrumentation Conference, School of Engineering Louisiana Polytechnic Institute, Ruston, Louisiana.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, E. K. Stevens, Mgr. International Exposition Co., 480 Lexington Ave., New York 17, N. Y.
Nov. 14-18, Chicago Exposition of Power & Mechanical Engineering, Chicago Coliseum, Chicago, Ill.

AIR CONDITIONING & REFRIGERATION INSTITUTE, Washington, D. C.
Nov. 28-Dec. 1, 9th Annual Air Conditioning & Refrigeration Exposition, Auditorium, Atlantic City, N. J.

28TH EXPOSITION OF CHEMICAL INDUSTRIES, E. K. Stevens, Mgr., International Exposition Co., 480 Lexington Ave., New York 17, N. Y.
Dec. 5-9, Exposition, Commercial Museum and Convention Hall, Philadelphia, Pa.

INTERNATIONAL ATOMIC EXPOSITION, 931 Book Building, Detroit 26, Michigan.
Dec. 10-16, International Atomic Exposition, sponsored by American Institute of Chemical Engineers; and Nuclear Engineer and Science Congress, coordinated by Engineers Joint Council. Exposition at Public Auditorium, Cleveland, Ohio.

PLANT MAINTENANCE AND ENGINEERING SHOW, Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.
Jan. 23-26, 7th Plant Maintenance & Engineering Show and Conference, Convention Hall, Philadelphia, Pa.

INSTRUMENTATION CONFERENCE, Chemical Engineering Department, Texas A&M, College Station, Texas.
Jan. 25-27, 11th Symposia on Instrumentation for the Process Industries, Texas A&M, College Station, Texas.

EDISON ELECTRIC INSTITUTE, 420 Lexington Ave., New York 17, N. Y.
Feb. 6-10, National Industrial Electric Heating Conference, Netherland Plaza Hotel, Cincinnati, Ohio.

SOUTHERN SAFETY CONFERENCE, INC., W. L. Groth, Executive Director, Box 8927, Richmond 25, Virginia.
March 4-8, 17th Southern Safety Conference and Exposition, Biltmore Hotel, Atlanta, Georgia.

More News—Page 86

$ $ $

For Your Ideas

SP&I's "Helping the Man-in-the-Plant" department (see page 73) features, ideas, methods and gadgets — many plant-tested in Southern and Southwestern industrial, power and service plants.

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

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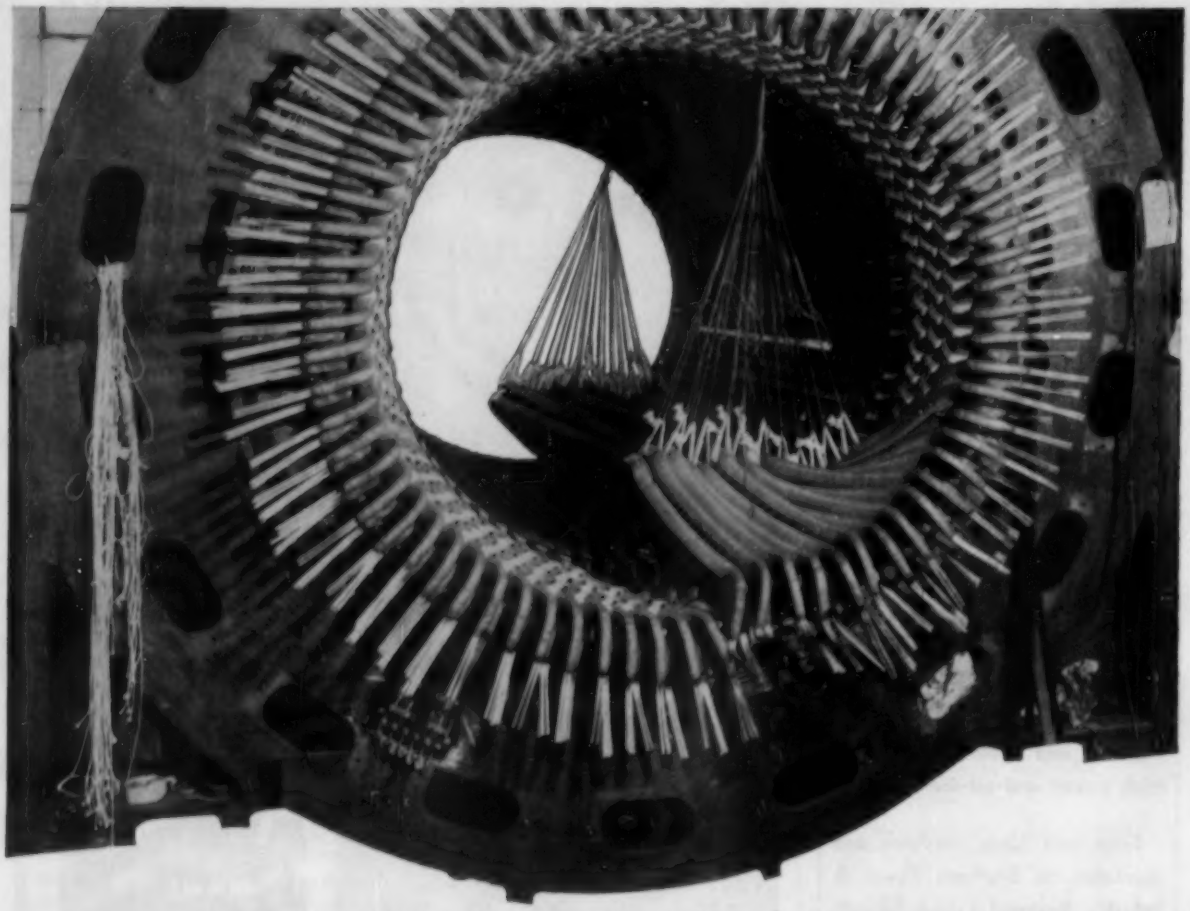

WHY WESTINGHOUSE REPLACEMENT COILS MEAN BETTER THAN NEW PERFORMANCE

Now! Westinghouse exclusive Thermalastic® insulated replacement coils are available for your motors and generators. Here are new, superior coils that will greatly extend the "new life" you rebuild into your equipment. Here are coils that will upgrade and, in most cases, actually uprate your equipment.

- Void-free. Impervious to moisture, ordinary solvents, oils, weak acids and alkalies.
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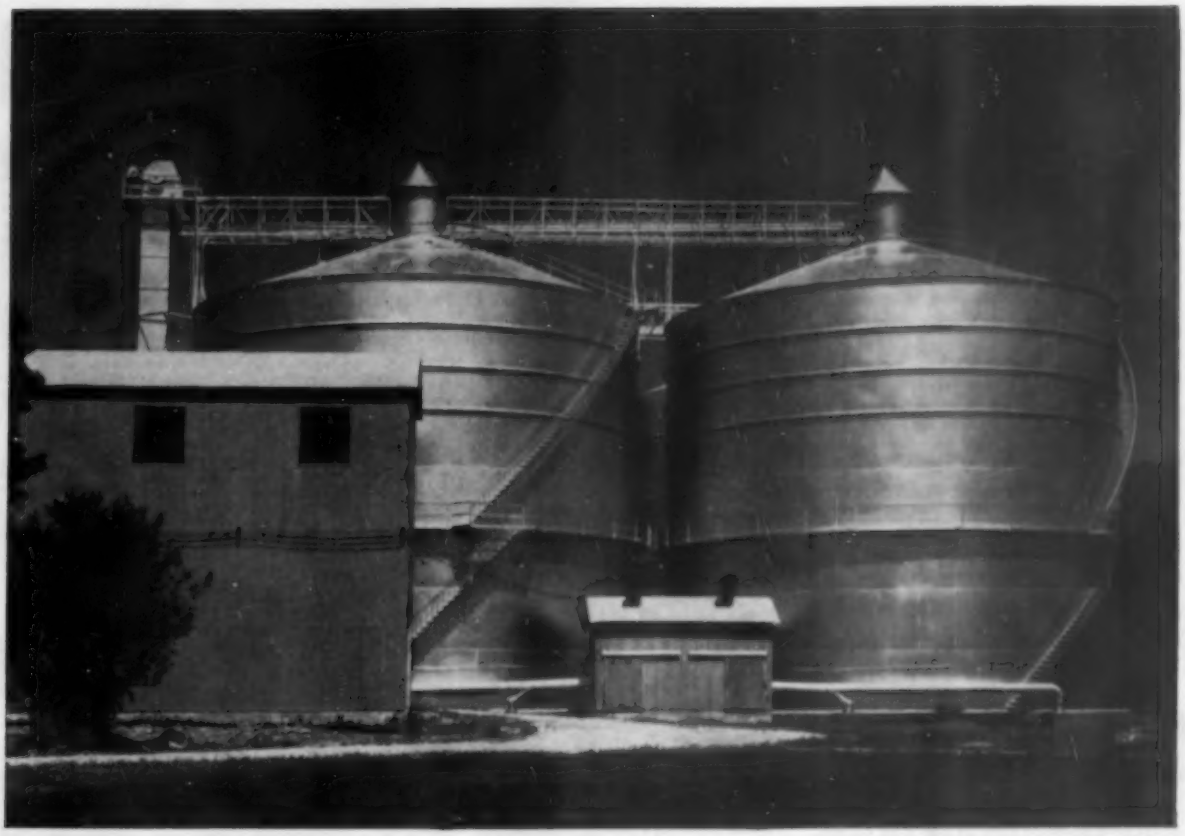

CB&I tanks like these may be your answer for clean, dry storage

Shown are two 200,000-bushel Horton® steel tanks installed for soybean storage at the Osceola Products Company, Osceola, Arkansas. They are 70-feet in diameter and 60-feet high. A ventilating system in the bottom of each tank draws air down through the seed and cools it whenever excessive moisture causes the contents of the tank to become heated.

Perhaps this installation will suggest the answer to a problem that you may have involving the storage of clean, dry, free-flowing products.

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WHERE TO GET IT *And How to Do It*

-INDEX OF HELPFUL BOOKLETS, BULLETINS, REFERENCE LITERATURE-

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STEAM TURBINES . . . FURNACES BOILERS, STOKERS, BURNERS

5 **CONTINUOUS BLOWOFF**—Bulletin—Describes how stainless steel rotary disc valve offers 15 calibrated orifices to provide any rate of flow. Sediment chamber protects orifices from plugging. No moving parts to wear out or leak. Read how to cure blow-off problems and save on fuel.—THE UNIBLOW VALVE COMPANY.

9 **PACKAGED BOILERS** — Bulletin AXY-1 generally describes the features and design of "Amesteam" Generators —shows how installation of these units provide dependable low cost steam for all types of plants—AMES IRON WORKS, INC.

11 **CONTROLLED FLOW GAS DAMPERS**—Catalog 10—Describes the reliable operation, increased capacity, reduced maintenance, greater flexibility, higher efficiency and other advantages gained by the Heacon damper in controlled flow of gases. —THERMIX ENGINEERING CO.

28 **FUEL BURNER PROTECTION** — Fireye Bulletin CP21, "Guarding Your Properties Against Flame Failure Explosions" — Gives a complete, non-technical explanation of the explosion danger inherent in fuel burning equipment and the protection which is now available.—COMBUSTION CONTROL CORPORATION.

29 **CONTINUOUS BLOW-OFF**—Bulletin, 8 pages—Gives the basic facts about boiler blow-off, and describes the Madden system of control of continuous blow-off for the removal of solids and impurities from steam releasing surfaces.—THE MADDEN CORPORATION.

35 **UNIT STEAM BOILERS**—Catalog AD-100—Gives complete information on oil and gas fired "Self Contained" boilers, 15 to 500 hp, 15 to 250 psi for processing and for heating. Gives features, applications, efficiencies, capacities and dimensions.—CLEAVER-BROOKS CO.

37 **STEAM BOILERS**—Bulletin SB-50, 16 pages—Describes and illustrates complete line of steam generating equipment, with sectional views, diagrams, plant applications. Condensed reference material for consulting and power engineers.—ERIE CITY IRON WORKS.

46 **AIR PREHEATERS**—Bulletin "The Ljungstrom Air Preheater," 36 pages—Explains fuel savings and increased performance possible by using waste heat in flue gases to preheat incoming combustion air. Explains operation, construction and economy of gas-to-gas preheaters of the continuous regenerative type.—THE AIR PREHEATER CORP.

56 **WATER TUBE BOILERS**—Booklet —Describes details of stoker—oil or gas or combination gas/oil, 10 to 250 hp to 250 psi; designed for easy conversion to any fuel.—QUEEN CITY ENGINEERING COMPANY, INC.

68 **OIL BURNERS FOR LIGHT OR HEAVY OIL** — Bulletin 65 — Describes National Airoil Type "LAP" oil burners to operate with light or heavy oil under manual or automatic control, using low air pressure for atomization. Wide firing range in each of seven sizes.—NATIONAL AIROIL BURNER COMPANY, INC.

86 **PULVERIZED FUEL SYSTEMS**—Bulletin, 20 pages—Gives information based on 50 years' experience in steam generation; well illustrated with cross-sectional drawings and graphs—gives advantages, typical installations, and descriptions of major operating parts. — FOSTER WHEELER CORP.

87 **STEAM TURBINES**—Single Stage—Bulletin 500 describes features and characteristics of company's type DH steam turbines in horisontal and vertical models. —DEAN HILL PUMP COMPANY, INC.

95 **BOILER REFRACTORIES** — 20-page Bulletin R-36 contains detailed discussions of critical refractories areas in both refractory-lined and water-cooled boilers.—BABCOCK & WILCOX.

FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

108 **RECIPROCATING COMPRESSOR** Bulletin M-70, 44 pages — The M-Line multi-stage, multi-cylinder, 100 to 5000 hp, 250 to 514 rpm reciprocating compressors. Applications and installations illustrated with photographs and cut-away views.—THE COOPER-BESSEMER CORP.

110 **ATOMIZING DEAERATOR** — Publication 4146—Describes completely the 900,000 lb/hr Cochrane atomizing deaerator as applied in a leading oil refinery power plant—and the possibilities of this heater unit elsewhere.—COCHRANE CORP.

119 **DEAERATING HEATERS** — Bulletin WC-110—Describes a new development—the package type heater for smaller boiler plants, completely equipped with all accessories. Flow diagrams, photographs of installations, etc.—GRAVER WATER CONDITIONING CO.

121 **HIGH SPEED CENTRIFUGAL PUMPS, SINGLE STAGE, DOUBLE SUCTION** — Bulletin 236 — Gives specifications, construction features, exterior and sectional views, dimensions, rating table of Type DBH high speed, single stage, double suction pumps, capacity 100 to 1,000 gpm, 200 to 400 ft total head, 3,500 rpm.—WARREN STEAM PUMP CO., INC.

122 **FAN EQUIPMENT**—Catalog 515—Covers Clarage portable ready units, complete "package" fans for light-duty ventilating and industrial service. In sizes available, capacities 100 to 12,000 cfm.—CLARAGE FAN COMPANY.

126 **MOTOR PUMP** — Catalog 7692-A — Gives a complete story of the application, characteristics, types, sizes and other data of Ingersoll-Rand motor pumps from ¼ to 40 hp, from 10 to 1500 gpm, from 0 to 600 ft head single and multi-stage. —INGERSOLL-RAND CO.

148 **HYDRAULIC PUMP-MOTOR** — Bulletin 22 describes low-speed and high-torque units for industrial service. Can be direct-connected without speed reducers, thus conserving space.—GEO. D. ROPER CORP.

170 **HEAT EXCHANGERS** — Bulletins 120 & 124 describe Aero units which cool liquids and gases by evaporative cooling with atmospheric air, removing heat at rate of input, and precisely controlling temperature. Solves problems of water availability, quality or temperature.—NIAGARA BLOWER CO.

196 **INDUSTRIAL HEATERS** — Bulletin RC-10-53—Describes the Thermobloc heat machine producing heat in any desired quantity and placing it where needed—an independent unit heater using the economical principles of direct heat transfer—low cost, automatic operation, tempered air, ease of installation, complete range of sizes from 100,000 Btu per hour to 1,000,000 Btu per hour.—PRAT-DANIEL CORP., THERMOBLOC DIV.

INSTRUMENTS—METERS CONTROLS—REGULATORS

202 **ORIFICE FLOW METERS**—Bulletin, 8 pages — Describes orifice meters used for the control of continuous blow-off of boilers, and of similar solids removal from steam and gas releasing surfaces, available in pressures up to 650 psi.—THE MADDEN CORPORATION.

209 **LIQUID LEVEL CONTROL**—Catalog — Describes Magnetrol liquid level control in which a sleeve, raised and lowered with a non-magnetic tube, attracts or releases an Alnico magnet attached to a mercury switch. Standard model can be easily adapted to meet any special requirement for pressure, temperature or corrosive liquid. Units available for controlling level changes from .0025-in. to 150-ft, with multi-stage switching when desired.—MAGNETROL, INC.

210 **WATER TEMPERATURE CONTROL** — Booklet describes complete line of controls for regulation of water temperatures, with flow of water from 1 gallon to 10,000 gpm. — POWERS REGULATOR COMPANY.

222 **PRESSURE REGULATORS**—Catalog 76—Gives complete detailed information covering applications, operation and specifications of Reducing Valves, Pump Pressure Regulators and Back-Pressure Regulators. Included is a simple, practical method for selecting size of regulators.—MASON-NEILAN REGULATOR CO.

226 **PRESSURE GAUGES** — Ashcroft Gauge Catalog, 124 pages—Information on pressure gauges, gauge accessories and gauge engineering, sectionalized by product lines, fully indexed, with selector tables for all gauges. Illustrated with photographs and line drawings.—MANNING, MAXWELL & MOORE, INC.

227 **LIQUID LEVEL GAGES**—Bulletin 11-1-51—Describes gages for water level or liquid level, water columns and the like—bronze, all-iron, forged steel, stainless steel for all sorts of industrial, chemical and power plant service, with details as to available sizes, applications and installations.—ERNST WATER COLUMN & GAGE CO.

257 **AUTOMATIC STEAM PRESSURE CONTROL**—Bulletin 462—Describes the Leslie pressure controller for supplying intermittent make-up to a low pressure system from a high pressure line—positive, faithful.—LESLIE COMPANY.

273 **CONTROL PANELS**—Bulletin 170, 8 pages—Describes the custom-designing of Bailey Control Panels to the requirements of individual plants, providing faster installation, more efficient design, greater economy, undivided responsibility and attractive appearance. — BAILEY METER COMPANY.

284 **PRESSURE CONTROLLERS**—Wizard Bulletin D-3—Describes the ingenious simple mechanism of Wizard controllers used to produce accuracy and dependability in pressure control — Bourdon tube for high pressure, bellows for low pressure.—FISHER GOVERNOR CO.

PLANT EQUIPMENT—WELDING TOOLS—PROCESS SPECIALTIES

305 **INDUSTRIAL HEATING**—Catalog 50, 50 pages—Gives data on the type and size of electric heating units and similar equipment for industrial heating needs. Detailed diagrams and photographs describe applications.—EDWIN L. WIEGAND CO.

309 **WIRE CLOTH**—Catalog, 103 pages—Gives wire cloth ranges and specifications for grades from 20 x 250 mesh up to 4" openings. Illustrates facilities for fabricating wire cloth parts and fabricated alloys.—THE CAMBRIDGE WIRE CLOTH CO.

315 **TANKS OF STEEL AND ALLOYS**—Catalog 103-P&BS—All types of tanks for hot water storage, bulk liquid storage, oil or chemical storage, and other unfired pressure vessel use.—J. J. FINNIGAN CO.

326 **GRATING — FLOORING**—Catalog, 12 pages—Gives picture story of "Weldforged" steel grating, flooring and stair treads—continuous spiral cross bars, alternating right and left, and slightly above bearing bars, electronically weld-forged into inseparable units to insure greater non-skid protection and durability.—KERRIGAN IRON WORKS, INC.

328 **WELDING STAINLESS STEEL**—52 page Booklet contains valuable data on the welding, brazing, soldering and hot cutting of stainless steel.—WAREHOUSE DIVISION, ATLANTIC STEEL COMPANY.

343 **LARGE ELEVATED STEEL TANKS** — "Horton Elevated Steel Tanks of Large Capacity" 25 pages—Describes the advantage of using large elevated steel tanks to provide gravity pressure in municipal and industrial water works systems. Detailed information on radial-cone elevated tanks, 500,000 to 2,000,000-gallons, and Horton spheroidal elevated tanks, 1,000,000 to 5,000,000 gallons.—CHICAGO BRIDGE & IRON CO.

356 **INDUSTRIAL SPACE HEATERS**—Bulletin GNC-10-52 and HDB-1-52—Picture and describe direct fired space heaters in sizes from 100,000 Btu to 1,000,000 Btu—oil or gas fired, floor mounted or suspended.—PRAT DANIEL CORP.

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704	712	714	746	755	784	803	805	841	855	902	908	921
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370 **WELDING ROD GUIDE**—32 page DirectoRod Guide helps you select from 160 rods those that will give you the largest savings per job, whether production, maintenance or salvage. — EUTECTIC WELDING ALLOYS CORP.

382 **ASPHALT HEATER** — Bulletin 9081—Describes the details of combustion chamber, tubular heat exchanger and related auxiliaries of the Todd Thermo-Convective Asphalt Heater. Shows how this automatic, low maintenance, high efficiency unit is especially designed to heat asphalt economically.—COMBUSTION EQUIPMENT DIVISION, TODD SHIPYARDS CORPORATION.

PIPING, VALVES, FITTINGS STEAM SPECIALTIES, TRAPS

404 **MALLEABLE PIPE UNIONS AND SPECIALS** — Catalog — Describes unions, union elbows, union tees, union flanges—with ground joint brass or all-iron seats. 300-lb, 250-lb and 150-lb pressures. AAR unions.—JEFFERSON UNION CO.

448 **HYDRAULIC VALVES, TWO-WAY, THREE-WAY and FOUR-WAY**—Bulletin H316—Describes construction, details, dimensions, applications of 2-way, 3-way and 4-way Yarway hydraulic valves for operating pressures up to 5000 lb.—YARNALL-WARING COMPANY.

451 **AIR RELIEF TRAPS** — Bulletin No. 2065—Describes application of ball float traps for venting air from hot water heating systems, water service lines, etc. Hook-up drawings, prices included.—ARMSTRONG MACHINE WORKS.

465 **STEAM-JACKETED VALVES** — Bulletin E-200—Describes the design, operation and special arrangement of steam jackets for handling viscous materials such as heavy petroleum, coal tar and chemical products, which congeal or harden under operating conditions. Illustrated, with engineering data.—EVERLASTING VALVE CO.

476 **BRONZE DISC VALVES**—Bulletin U-61—Describes features and construction of renewable composition disc valves: globe, angle, check and stop and check. Specifications and standard sizes are included. Description of the discs available and a guide to their uses.—THE FAIRBANKS COMPANY.

492 **VALVE CONTROLLER** — Bulletin 3500, 8 pages, gives construction features, engineering design and data, characteristics and performance, specifications and applications, etc., of the "Positrol," Fisher Series 3500 Valve Controller.—FISHER GOVERNOR CO.

493 **UNIONS AND CHECK VALVES**—New Catalog—Shows complete line of Perfect Seal forged steel unions and swing check valves, complete with sizes pressures, and engineering data.—CATA WISSA VALVE & FITTINGS COMPANY.

494 **BRONZE GLOBE VALVES**—Form 193 — Describes the new Armor Seat plug-type bronze globe valve for 300 lb service, suitable for severe services such as pressure regulation, steam control bypass lines, temperature regulation, apparatus throttling, bleeds, drips and drains, soot blowers, continuous blow downs, or any other close regulation of steam.—JENKINS BROS.

MAINTENANCE PACKING GASKETS, LUBRICATION

512 **CLEANING GAS WASHERS**—Bulletin 451—Describes the cleaning of clogged, inefficient gas washers while in operation—with many case studies.—DOWELL, INC.

518 **PACKINGS & GASKET CUTTERS** — Catalog, 50 pages — Describes "The Packing That Packs All," manufactured in a variety of forms such as coil spool, loose, rings, sets, spiral, and sheet Designates materials available. Covers gasket cutters and related items. Illustrated with photographs and drawings.—THE ALLPAX COMPANY, INC.

525 **HEAVY DUTY VACUUM CLEANING**—Survey—To show the advantages of increased productivity, better quality control, reduced fire and health hazards which are possible through the use of U. S. Hoffman Machinery heavy duty vacuum cleaning equipment.—U. S. HOFFMAN MACHINERY CORP.

538 **PRODUCTS FOR PROCESS INDUSTRIES** — Bulletin IP-28A, 8 pages—Describes industrial insulation, refractories and insulating brick for furnaces, ovens and kilns, overhead and underground pipelines, packings, gaskets and other products used generally in process industries.—JOHNS-MANVILLE, INC.

541 **DIESEL UPKEEP** — Booklet, 44 pages—Offers practical ideas to expedite diesel maintenance, keep operating costs low, and extend equipment life. Covers cleaning filters, desludging lube oil coolers, descaling jacket water coolers, degreasing engine parts before repair, steam detergent cleaning, etc.—OAKITE PRODUCTS, INCORPORATED.

546 **METAL PACKINGS** — Brochure 3839 — Describes split-case metal packings for air compressors, which can be installed without disconnecting rod. Minimum life of seven years with proper lubrition.—GARLOCK PACKING CO.

576 **MECHANICAL SEALING**—Catalog 455-SD—A family album describing various types of dura seals designed to meet specific operating conditions—a complete reference guide book. — DURAMETALLIC CORP.

584 **AIRWAY MARKING PAINTS**—Bulletin—Describes Aerox orange and white paint conforming to U. S. specifications for marking airways and similar applications for both metal and wood. This paint is often used in conjunction with Subalox Anti-Corrosive Paint. SUBOX, INC.

596 **TUBE CLEANERS AND EXPANDERS**—Catalog 77—Covers tubes in high pressure boilers, superheaters, economizers and other heat exchange equipment. Model 88 expander rolls and flares in single operation.—THOMAS C. WILSON, INC.

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ENGINES, DRIVES POWER TRANSMISSION MATERIALS HANDLING

609 **WIRE MESH CONVEYOR BELTS**—Handbook, 140 pages—Illustrates and describes conveyor and conveyor belt designs, the uses and specifications of wire mesh conveyor belts. Covers many industrial applications. Contains valuable metallurgical data.—THE CAMBRIDGE WIRE CLOTH COMPANY.

632 **GAS COMPRESSORS**—Bulletin JM—Describes with complete specifications, the type JM compressor, a 1 to 6 crank throw compressor rated at 500 to 2750 hp, driven by motor, engine or turbine.—COOPER-BESSEMER CORP.

641 **CONVEYORS**—Vol. 211, 16 pages—Conveyor applications are illustrated in several case studies. Alabama, Virginia, and other Southern installations. Line diagrams illustrate operations.—STEPHENS-ADAMSON MFG. CO.

648 **BELT FASTENING TOOLS**—Bulletins F-110 and F-111—Describe new Flexco power tool wrenches and power tool boring punches, designed to speed up fastening of wide conveyor belts; and give recommendations on the use of various impact tools connected therewith.—FLEXIBLE STEEL LACING CO.

657 **MATERIALS HANDLING**—Catalog T-54, 24 pages—Gives structural details, specifications, engineering data, photographs on over fifty models of Fairbanks two-wheel and platform trucks, including hand trucks, steel framed platform trucks, lift jack platform trucks, wagon trucks and dollies.—THE FAIRBANKS CO.

693 **ADJUSTABLE VARIABLE SPEED DRIVES**—Condensed Catalog No. 168T—For engineers and salesmen in making estimates on speed control for any machine or process. Prices, dimensions, applications for ½ hp to 25 hp motors, enclosed, drip-proof standard or special mounted—STERLING ELECTRIC MOTORS, INC.

694 **STOCK ROLLER CHAINS AND SPROCKETS**—Catalog No. 754, 66 pages—Describes and illustrates Stock roller chains and sprockets including minimum and finished bore, ready-to-use Taper-Lock bushed sprockets, as well as chain selection and application data.—DIAMOND CHAIN COMPANY, INC.

WATER TREATMENT, HEATING, VENTILATING, AIR CONDITIONING REFRIGERATION, DUST & FUME CONTROL

703 **AIR CONDITIONING** — Bulletins 113 & 122 describe "controlled humidity" method where cooling and heating functions are made completely separate from adding or taking away moisture. No moisture sensitive instruments needed in flexible and compact design.—NIAGARA BLOWER CO.

704 **WATER CONDITIONING** — Brochure describes company's engineering services—zeolite water softeners, filters and purifiers, modernized and rebuilt water softeners, aerators and degasitors and process and boiler water conditioning. SOUTHERN WATER CONDITIONING, INC.

712 **ION EXCHANGE EQUIPMENT**—Bulltin A-255—Describes the various methods of ion exchange treatment which provide suitable boiler feedwater, process water, and purified solutions.—ILLINOIS WATER TREATMENT CO.

714 **INFRA-RED UNIT HEATERS**—Bulletin P-154—Describes "Panelbloc" infra-red unit heaters available in 62,500 btu and 125,000 btu input. No fan, motor, or electrical connection is needed. Heating is accomplished by guided radiation. The units may be used with any commercial type gas fuel. THERMOBLOC, DIVISION OF PRAT-DANIEL CORPORATION.

746 **SLIME AND ALGAE CONTROL**—Bulletin 52 explains the advantages of Naico cuprose over copper sulphate for the control of slime and algae in reservoirs, cooling systems, ponds and lakes.—NATIONAL ALUMINATE CORP.

755 **BOILER WATER CONDITIONING**—Catalog, 12 pages—Outlines difficulties caused by industrial water contamination, and recommends water conditioning treatment for scale, sludge, corrosion, carryover and other boiler troubles. Details on the Drew System of complete boiler water conditioning are fully explained.—E. F. DREW & CO., INC.

784 **REFRIGERATION VALVES AND FITTINGS**—Catalog 6, 40 pages—Describes valves and fittings for ammonia, Freon and other refrigerants, for use in industrial refrigeration, ice making and air conditioning.—FRICK CO.

ELECTRICAL

803 **LIGHTING STANDARDS**—Catalog 31 F, complete with engineering data and illustrations—Shows "Weldforged" lighting standards for plant property, streets, highways, playgrounds, churches, housing projects, shopping centers, plants of all sorts—also mast arms and brackets.—KERRIGAN IRON WORKS, INC.

805 **POWER FACTOR CORRECTION**—28 page catalog shows how you can cut power costs by installing correction capacitors on motors and other inductive electrical equipment. Greater loads can be handled from existing circuits. Wiring, transformer and switchgear costs can be greatly minimized in new installations.—SPRAGUE ELECTRIC CO.

841 **APPLYING ELECTRIC HEAT**—"101 Ways to Apply Electric Heat"—Gives illustrated case histories showing experience-tested methods of applying Chromalox electric heating elements. Physical aspects of installation are shown along with the description of the problem, solution and advantages obtained.—EDWIN L. WIEGAND CO.

KEEP UP-TO-DATE

- Ideas
- Methods
- Equipment

USE SPI READER SERVICE

See Service Card on Opposite Page

855 **WIREWOUND RESISTORS**—Catalog 101—Describes power type fixed wirewound resistors manufactured in accordance with the requirements of Military Specification MIL-R-26B—gives complete series of standard resistor values and maximum permissible currents.—SPRAGUE ELECTRIC COMPANY.

MISCELLANEOUS . . . SAFETY, BUILDING EQUIPMENT, METALS

902 **BUILT-UP ROOFING** — Bulletin 5591, 16 pages—General requirements on built-up roofing specifications including instructions for over wood, precast or poured gypsum; spray pond roofs; concrete, precast concrete slab; information on fire-resistant vapor barrier flashing details; etc.—THE PHILIP CAREY MFG. CO.

908 **TRANSLUCENT FIBERGLASS PANELS**—Data sheet shows how shatterproof panels end pane replacement. Ideal for glazing factory windows where pane breakage is high. Panes are unaffected by weather extremes or usual industrial fumes. Panels transmit almost as much light as clear glass.—RESOLITE CORP.

921 **VACUUM CLEANING**—Form A-700, 16 pages—Describes the greater plant cleanliness, safety and productivity gained through the use of Hoffman heavy duty vacuum cleaning. Applications and installations illustrated.—U. S. HOFFMAN MACHINERY CORP.

926 **SIMPLIFIED FENCE PAINTING**—Bulletin—Describes complete paint system where a single coat gives an excellent and lasting job. Subalox metallics simulate the appearance of galvanizing. Old fences can be given a "new look" which can be easily maintained with a minimum of time, labor and material cost.—SUBOX, INC.

927 **FLOOR GRATING** — Catalog No. AT254—Describes company's free planning and checking service for completely custom fabricated floor grating installations.—BORDEN METAL PRODUCTS CO.

934 **GRATING, FLOORING, TREADS**—Catalog—Describes the design and value of Bonderite processed "Weldforged" steel grating, flooring and stair treads for corrosion resistance, paint adhesion and prolonged life.—KERRIGAN IRON WORKS, INC.

936 **STOCK & WEIGHT HANDBOOK**—84 pages. Gives complete information on all sizes and shapes of stainless and carbon steel products normally carried by steel warehouses. Useful charts and tables.—WAREHOUSE DIVISION, ATLANTIC STEEL COMPANY.

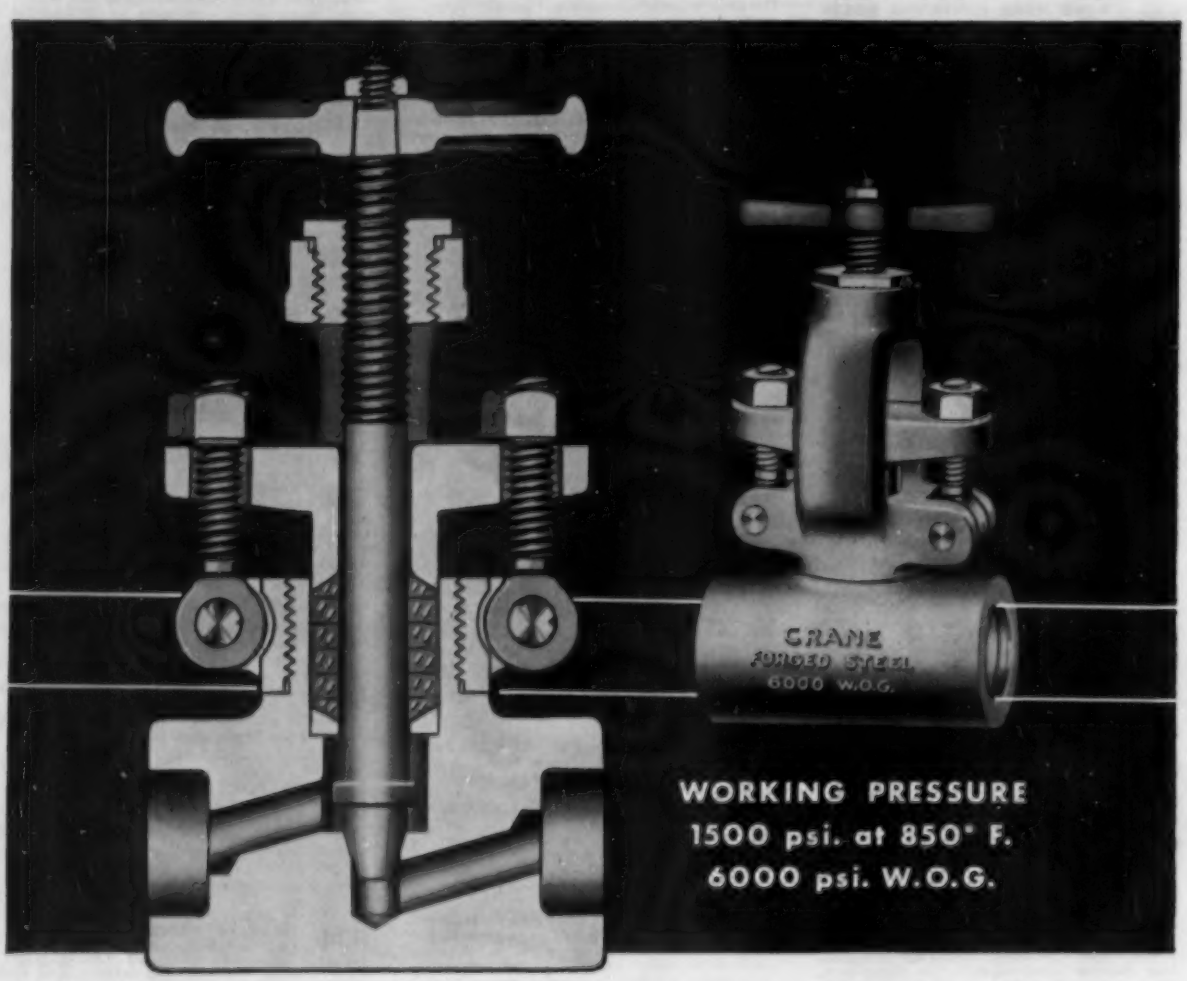
937 **STEEL MEASURING TAPES** — Complete catalog describes full line of measuring tapes from 6 to 100 ft., including wide blade tape with upright measurements.—EVANS RULE CO.

959 **THERMAL INSULATION** — Chart IN-6D, 11½ in. x 18 in., suitable for hanging on the wall, shows at a glance the recommended insulation for every temperature range, from minus 400 F to plus 3000 F. —JOHNS-MANVILLE CORP.

More Catalogs — Page 84

New Equipment — Page 78

Now Available



New Crane Forged Steel Instrument Valves

Been looking for an exceptionally rugged, compact, and low-priced stop valve for your small hydraulic or high-pressure, high-temperature instrument lines?

Crane has developed it—sizes ¼", ⅜" and ½", in both screwed and socket-welded patterns. It's the all-new Crane Forged Steel Instrument Valve, and you can specify it now for immediate delivery.

Will Handle Many Services

Note closely the over-all design and construction shown above of this new Crane valve. Oversized stuffing box—heavy-duty Crane Exelloy stem with integral disc—bolted gland—swinging gland eye bolts—outside screw and yoke construction—all add up to the high performance and low maintenance you want in a valve for your instrument panels, orifice meters, bypass and gauge lines, regulator leads, and other hydraulic and high pressure/temperature lines.

Literature on Request

These rugged, low-cost stop valves are built for 1500 psi. at 850° and 6000 psi. W.O.G. Construction and materials are job-engineered by Crane experts—backed by a century of quality manufacturing, matchless experience. You'll want complete information on the all-new Crane Forged Steel Instrument Valves. Contact your Crane Representative, or write to Crane Co., General offices, Chicago 5, Illinois—Branches and Wholesalers serving all industrial areas.

CRANE CO.

VALVES • FITTINGS • PIPE
KITCHENS • PLUMBING • HEATING

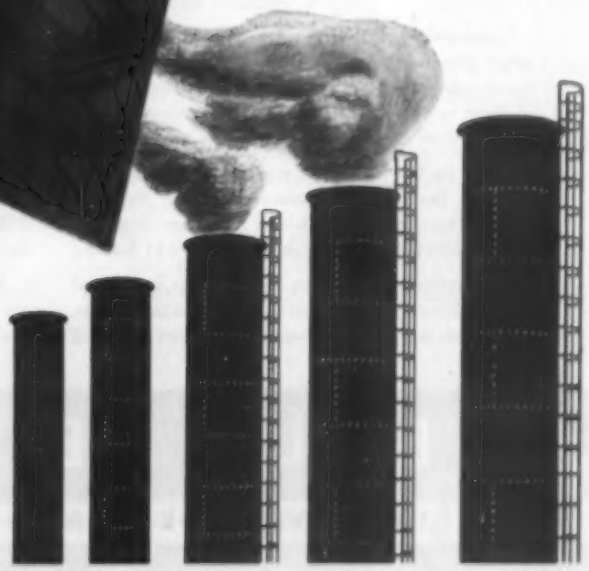
CRANE'S FIRST CENTURY...1855-1955

precious BTU's can go up a small stack — too!

Whether heat is at work . . . or on its way up the stack — every BTU you generate costs you money. Heat recovery, therefore, is dollar recovery — *in any size boiler.*

Now with the Package Ljungstrom® Air Preheater, even boilers as small as 25,000 pounds of steam per hour can operate at fuel efficiencies never before practicable. Compact and self-contained, the unit operates the same as the large Ljungstroms so widely used in large industrial installations — waste heat is absorbed from flue gas by a rotating surface . . . transferred to incoming combustion air . . . and funneled back to the furnace — reducing your fuel costs 1% for every 45-50°F of preheat.

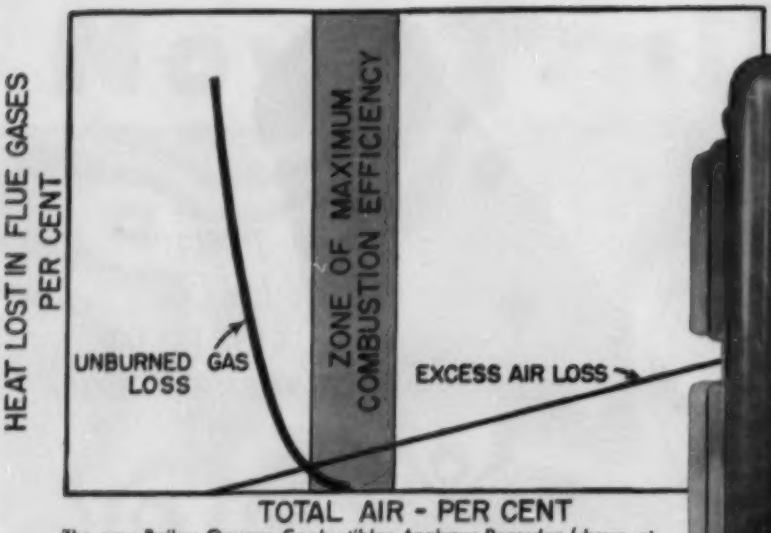
Find out how you can save with the Package Ljungstrom Air Preheater. Write to The Air Preheater Corporation.



New operating efficiency for small boilers
The Package Ljungstrom Air Preheater

- **Reduces fuel consumption . . . permits use of lower-grade fuels**
- **Increases boiler output and reliability**
- **Eliminates cold spots . . . keeps corrosion to a minimum**
- **Easy, fast to clean and maintain**
- **Comes fully assembled — ready to be installed.**

The Air Preheater Corporation 60 East 42nd Street, New York 17, N. Y.


HEAT LOST IN FLUE GASES PER CENT
UNBURNED GAS LOSS
ZONE OF MAXIMUM COMBUSTION EFFICIENCY
EXCESS AIR LOSS
TOTAL AIR - PER CENT

The new Bailey Oxygen-Combustibles Analyzer-Recorder (shown at right) provides a continuous two-in-one check of combustion efficiency by recording both oxygen and combustibles in flue gas. As shown by above chart, both measurements are needed to determine combustion efficiency.

BAILEY announces . . .
New 2 in 1 way to measure Combustion Efficiency

The new Bailey Oxygen-Combustibles Analyzer-Recorder gives you a continuing double check on combustion economy. It's fast response measures and records:

1. **Excess air**—regardless of the fuel or combinations of fuels being burned.

2. **The mixing efficiency of your fuel-burning equipment**—by indicating the amount of combustibles in your flue gas, resulting from incomplete mixing of fuel and air.

Combustion efficiency depends upon fuel-air ratio. Too much fuel can be even more costly than too much air. And because of the interdependence of these two factors, no control that measures only one of them can give you complete protection.

Now, for the first time, you can check *both* with a *single* fast acting instrument, using the new Bailey Oxygen-Combustibles Analyzer-Recorder for industrial furnaces, kilns, heaters and boilers.

Fuel economy improves as excess air is reduced —until unburned fuel begins to show up in the flue gas. When this happens, combustion efficiency drops off sharply if there are further decreases in the air-fuel ratio. That's why combustion gases must be analyzed for *both* oxygen and combustibles to get a true indication of efficiency—and that is why Bailey coordinates both measurements on the same chart, to show when excess air may be reduced safely without danger of greater losses from unburned gases.

The Bailey Oxygen-Combustibles Analyzer is an approved combustion safeguard.

Ask your local Bailey engineer for suggestions on application. Equipment details in Product Specifications E65-1 and E12-5. P31-1

BAILEY METER COMPANY

1028 IVANHOE ROAD • CLEVELAND 10, OHIO

INSTRUMENTS AND CONTROLS

for Power And Process

PHYGON-XL is a low-cost and effective control for the most troublesome nuisance organisms in water—Algae.

Algae in an industrial water system can have far reaching effects on acidity, on outlets, inlets, filters and pipes in a distribution system. Use Phygon-XL to eliminate these troublesome factors. Added directly into the system at a rate of four pounds per million gallons of water, PHYGON-XL reduces over-all purification costs and the frequency of cleaning or back-washing filters.

Using PHYGON-XL to suppress blue-green algae blooms in lakes, ponds and reservoirs, also provides an opportunity for the vigorous growth of helpful aquatic plants. It can be mixed with water and applied as a spray over the area to be treated—about one half pound to one pound of Phygon-XL for blue-green algae, and five pounds for green algae per acre of water surface.

You'll find PHYGON®-XL is: effective, easy to use, and inexpensive. Write, wire or phone us if you are unable to locate an immediate source of supply.

Naugatuck Chemical

Division of United States Rubber Company
Naugatuck, Connecticut

US RUBBER

producers of seed protectants, fungicides, miticides, insecticides, growth retardants, herbicides: Spergon, Phygon, Aramite, Synklor, MH, Alanap, Duraset.

Coals come clean in B&Z's eleven washing plants

...every ton is Superwashed!

Look for these scatter tags in every load

When you specify Bell & Zoller *Superwashed* coals —look what happens! You get a fuel that is scientifically sized and processed for the most exacting industrial burning requirements . . . each ton is *Superwashed* at the mine to free it from heat wasting dust, dirt and other incombustibles.

The results are "prescription-prepared," clean-burning, low-ash, high heat-producing coals that keep your steam costs at a minimum—coals that save you vital time and money *as you use them!*

Call or write your nearest Bell & Zoller office today. A combustion engineer will make a survey of your burning equipment and requirements—determine *exactly* which of the famous Bell & Zoller *Superwashed* coals from the finest coal fields in Pennsylvania, West Virginia, Illinois, Indiana and Kentucky will do the best job for you. There's no obligation, of course.

BELL & ZOLLER COAL COMPANY

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Producers of ZEIGLER, MOSS HILL, ORIOLE, MURDOCK, BUCKHORN and SPARTA Coals

FACTORS TO BE CONSIDERED IN SELECTION OF HIGH TEMPERATURE STEAM POWER PIPING	
STEEL MANUFACTURE AND RAW MATERIALS PROCESSING FACTORS	MELTING AND CASTING HOT WORKING HEAT TREATMENT INSPECTIONS ACTUAL EXPERIENCE WITH SPECIFIC COMPOSITION
FABRICATION FACTORS	HOT BENDING, FORGING HEAT TREATMENT WELDING POST HEAT TREATMENT MACHINING INSPECTIONS ACTUAL EXPERIENCE WITH SPECIFIC COMPOSITION
SERVICE FACTORS	HIGH TEMPERATURE LOAD CARRYING CAPACITY (x1000) STABILITY WITH TIME GENERAL

M. W. KELLOGG'S METALLURGICAL LABORATORY KEEPS PACE

As shown above, there are many factors—all increasingly important to steam-electric power plants—in selecting materials for tomorrow's main and reheat steam piping needs. Prepared by M. W. Kellogg's metallurgical laboratory, and reproduced here only in part, this chart indicates the extent to which Kellogg's metallurgical laboratory supports Kellogg's fabricating facilities in meeting the challenge of higher temperatures and pressures.

One recent Kellogg assignment, by a leading public utility, is the problem of selecting a super alloy for main steam piping to operate at 5500 psi and 1200 deg. F. A testimonial to the leadership and experience of the M. W. Kellogg metallurgical laboratory, this problem will include selection of special welding materials, welding techniques, and heat treating procedures.

Working closely with power companies at every stage of such problems is the prime function of Kellogg's metallurgical laboratory, and is carried through to periodic inspection of the piping in service. We welcome the opportunity to acquaint you with these facilities.

FABRICATED PRODUCTS DIVISION

THE M. W. KELLOGG COMPANY, 225 BROADWAY, NEW YORK 7, N. Y.

The Canadian Kellogg Company, Ltd., Toronto • Kellogg International Corporation, London

SUBSIDIARIES OF PULLMAN INCORPORATED

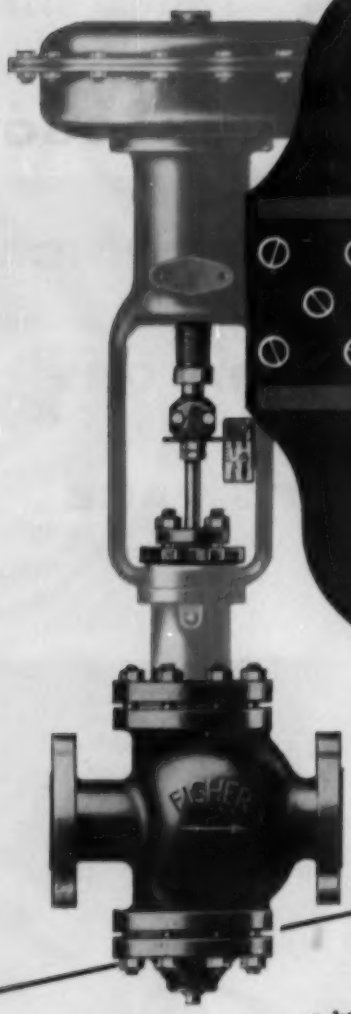
**Trademark of The M. W. Kellogg Company*

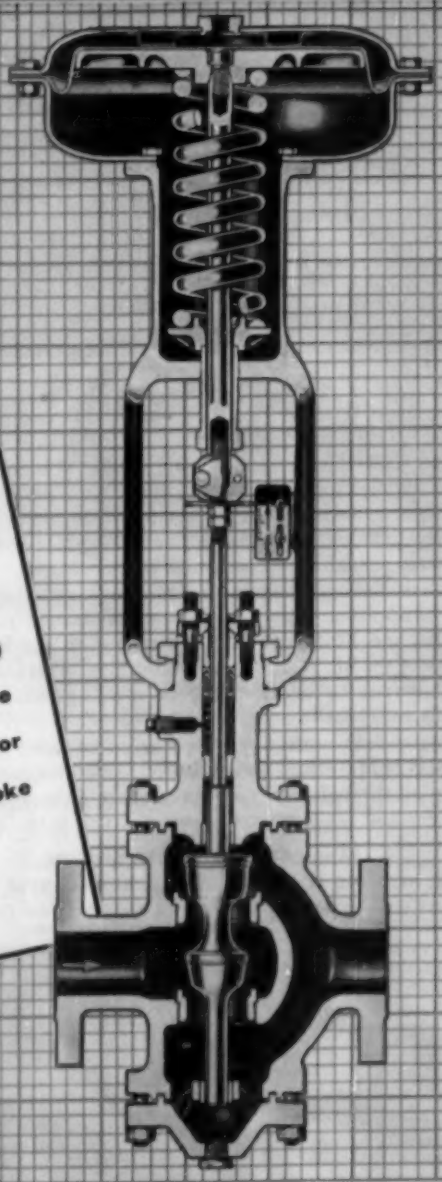
The soundness of Kellogg's metallurgical studies prior to fabrication is evident from the condition of the welds on this stainless steel power piping when inspected recently. In service for 18 months at 2350 psi and 1100 deg. F., over 70 butt welds made with Kellogg's K-Weld* process were found to be in perfect condition. *(Photo at power station, Kearny, N. J., courtesy Public Service Electric & Gas Co.)*

POWER PIPING—THE VITAL LINK

FISHER®

DIAPHRAGM





● Fisher Diaphragm Motor Valves are furnished in a wide variety of pressure ratings and materials. Topworks may be either direct acting (Series 657) or reverse acting (Series 667). Handjacks are available for either diaphragm casing mounting or yoke mounting. There are six diaphragm and yoke size combinations.

Improved

MOTOR VALVES

Improved PERFORMANCE FEATURES

- **Bolted-clamp type stem connection allows stem adjustment of 50% of total travel. Can be disconnected in the field without stem damage. Will not shake loose from vibration or rotational inner valve forces.**

- **Rugged body to yoke connection with hammer lug nut. Topwork can be removed without disturbing stuffing box.**

- **Specially designed Buna N molded diaphragms with Nylon insert retain superior flexibility at low ambient operating temperatures. Provides linearity between operating pressure signal and travel, and gives maximum effective area.**

- **Bolted gland stuffing box with Teflon packing.**

- **Stainless steel clear view travel indicator.**

- **Spring ranges: 3 to 15 psi; 6 to 30 psi.**

FISHER GOVERNOR COMPANY • Marshalltown, Iowa

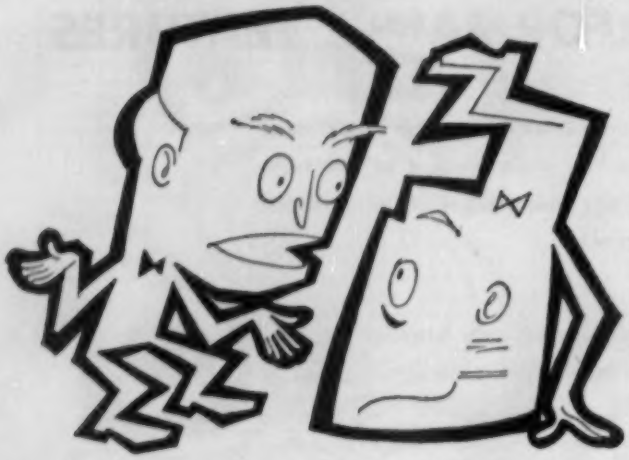
WORLD LEADER IN RESEARCH FOR BETTER PRESSURE AND LIQUID LEVEL CONTROL

FISHER

Our 75th ANNIVERSARY

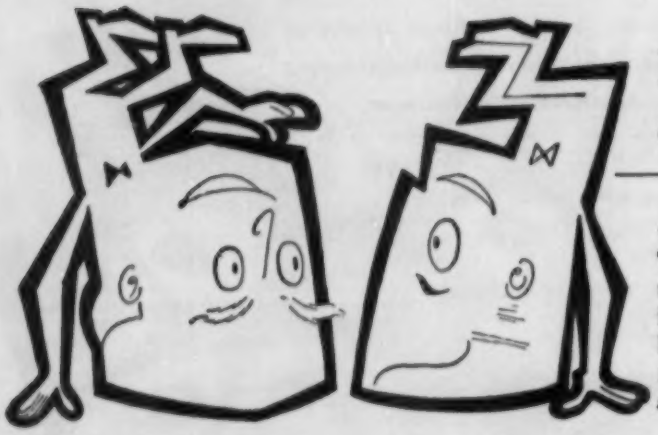
Our coal bills are lower than they used to be. Are we getting cheaper coal?

No. The coal may be higher priced, but it just costs less.



Man, you've gone crazy! Telling me high-priced coal costs less.

That's exactly what I mean. This coal has less moisture and less ash. That leaves more usable coal in every ton. It burns better in our type of boiler. Add it up, and we're getting the same amount of steam with a lot less coal.



How did you find out about this coal?

I asked the Chesapeake and Ohio coal people to recommend a coal that would give less smoke. The coal they suggested not only burns practically smokelessly, but as you see for yourself, it costs less. I used to buy coal strictly on price, but I know better now. Picking the right coal for any particular set of conditions is a job for an expert.

P.S.

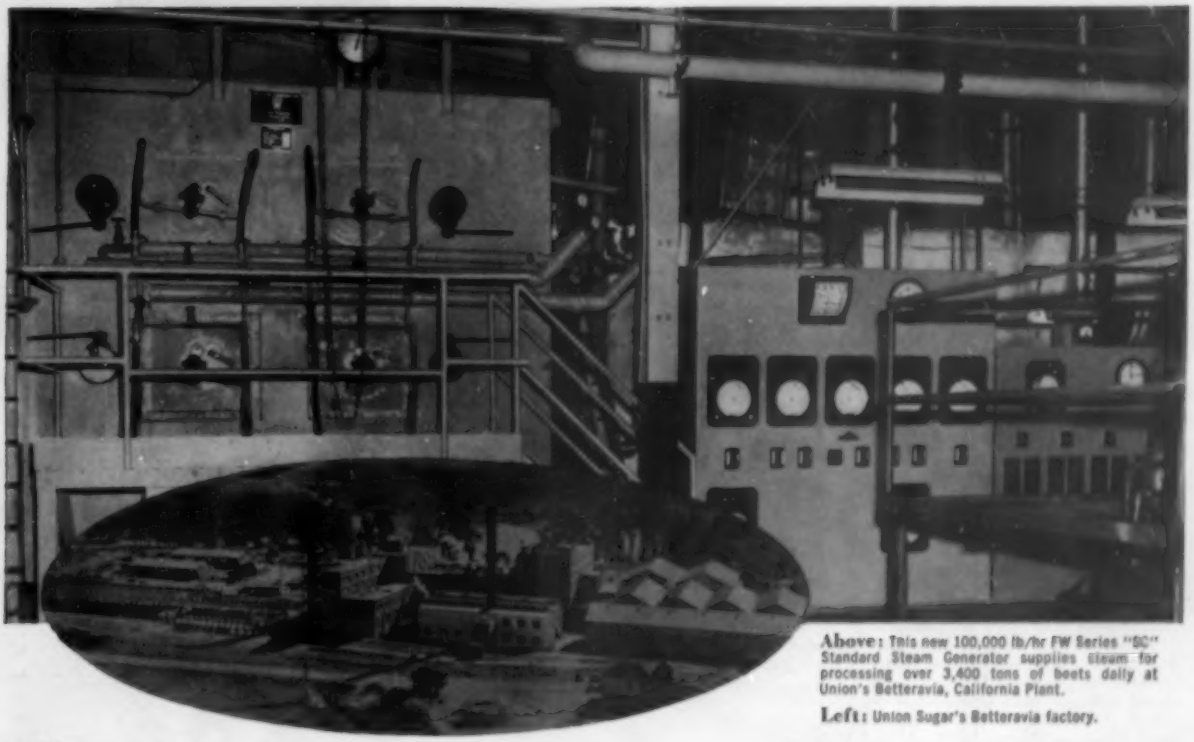
There's a lot more to buying coal than the cost per ton. Why not contact coal producers on the C&O to solve your particular fuel requirements, or write to: R. C. Riedinger, General Coal Traffic Manager, Chesapeake and Ohio Railway Company, Terminal Tower, Cleveland 1, Ohio.

Chesapeake and Ohio Railway

WORLD'S LARGEST CARRIER OF BITUMINOUS COAL

Union Sugar

obtains low-cost steam



Above: This new 100,000 lb/hr FW Series "SC" Standard Steam Generator supplies steam for processing over 3,400 tons of beets daily at Union's Betteravia, California Plant.

Left: Union Sugar's Betteravia factory.

with a new

FW Series "SC" steam generator

This new Foster Wheeler "SC" Series Standard Steam Generator is a part of a continuing modernization and expansion program being carried on by the Union Sugar Division of Consolidated Foods Corporation, a pioneer California beet sugar company.

In selecting this unit, Union has taken advantage of the latest development by Foster Wheeler toward the reduction of industrial steam costs. This new generator embodies advanced design features which result in low installation, operating and maintenance expenses.

Maximum dependability under continuous full-load is assured by such advantages as: completely water-cooled furnace, fully drainable superheater, highly efficient boiler surface arrangement, and unrestricted circulation. The design also provides flexibility in heat recovery equipment, balanced or pressurized firing and steam purifying systems.

Fuels: Oil or gas—*Steam Temperatures:* Saturated to 950F—*Capacities:* 50,000 to 150,000 lb/hr—*Pressures:* to 1500 psi.

For complete information, write for Bulletin B 55-4, *Foster Wheeler Corporation, 165 Broadway, New York 6, N. Y.*

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Quick Solutions for Everyday Problems...

Specifically designed by SOUTHERN POWER AND INDUSTRY to serve the needs of Southern engineers, operating officials, department heads and maintenance foremen, "CHARTS" gives quick solutions for everyday problems. And now you can get a three-year subscription to S.P.I. PLUS a copy of "CHARTS" for only $3.00.

Note the wide range of subject matter:

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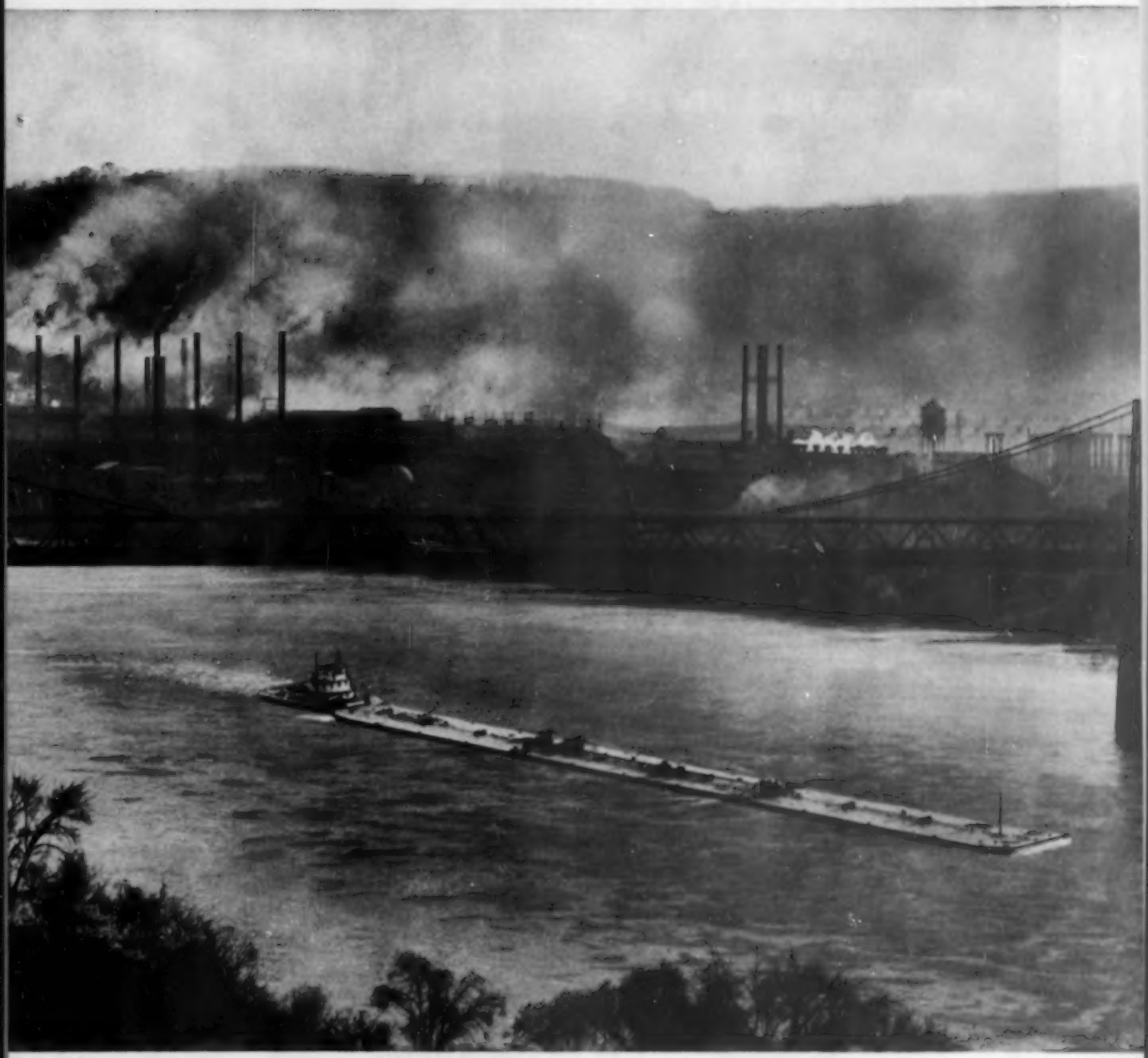
GOING PLACES *on the nation's rivers with Cities Service...*



Cities Service petroleum products travel by fast supertankers... they also move by plodding barge over the nation's inland waterways from Cities Service refineries to major midwest distribution centers... today they are traveling over water, over land and underground in record quantity, to meet a record customer demand.

CITIES SERVICE

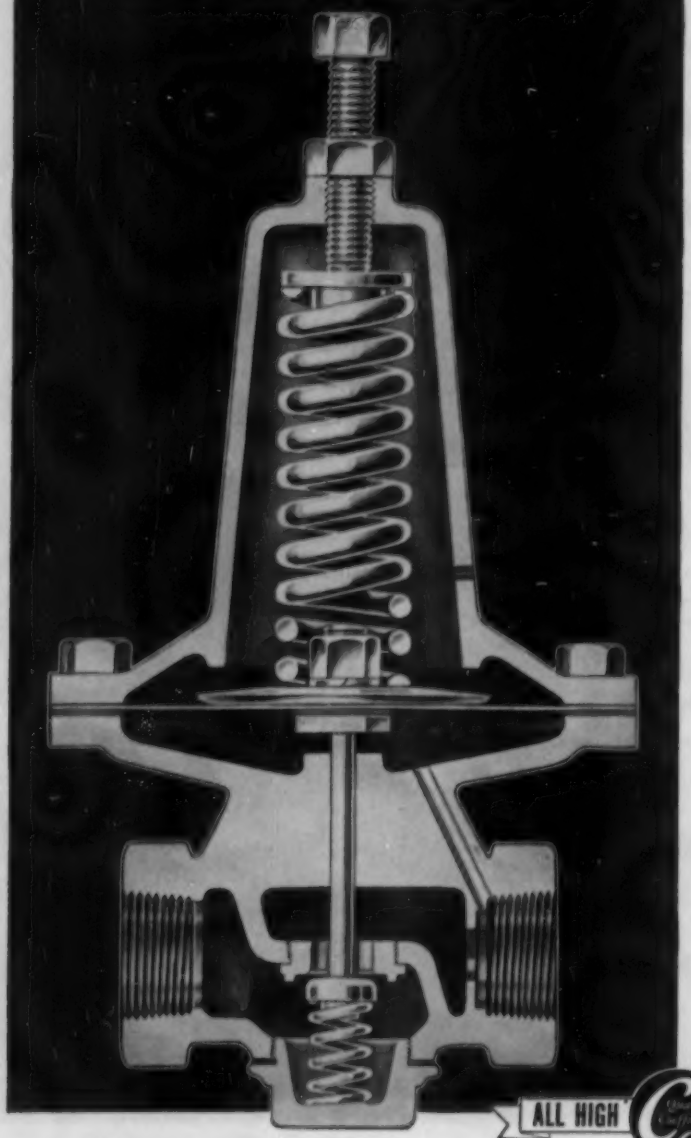
A Growth Company

Number 14 of a series

MASONEILAN No. 33

FOR SMALL

STEAM LINES



Wide Range of Adjustment

Here's a versatile, dependable way to keep small steam or air line pressures constant. An accurate, tight-closing reducing valve, Masoneilan No. 33 gives you an unusually wide range of adjustment.

Simplifies Maintenance

Easy to install, adjust and service, Masoneilan No. 33 reduces maintenance to a minimum. Stainless steel valve plug and seat ring assure long life. All parts are removable with valve in the line.

Available for initial pressures up to 200 lbs., reduced to any pressure from 2-20, 20-60, 60-100 psi. Sizes ¼" to ¾". For more information write Mason-Neilan Regulator Company, 1206 Adams Street, Boston 24, Mass. . . . or see your local industrial distributor.

Order from your Mason-Neilan Distributor. Use his experience. Save work, save time.

ALL HIGH Quality Control PRODUCTS

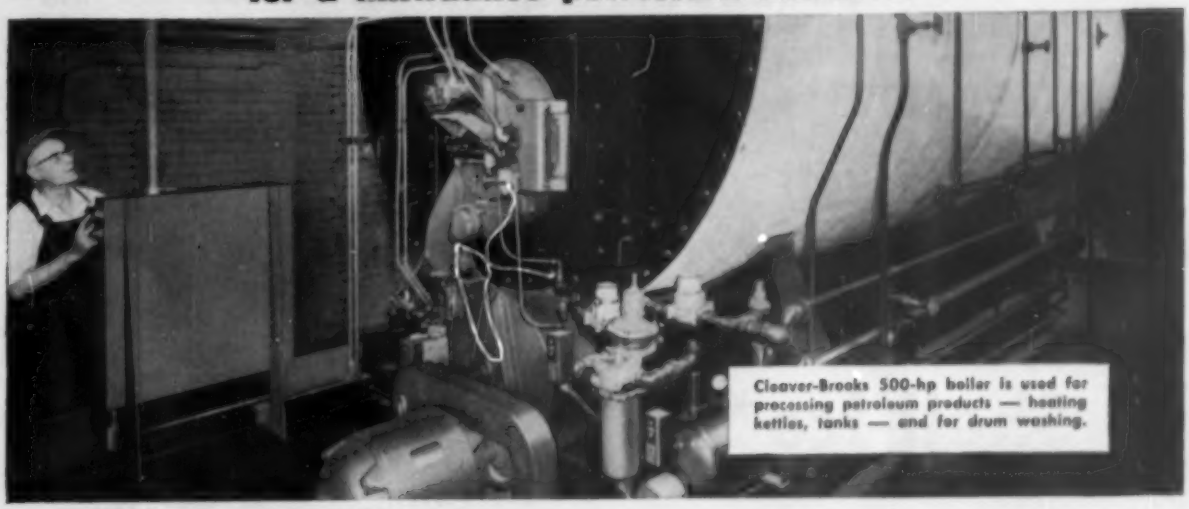
No. 11 for steam No. 71 for air No. 227 for water No. 33 for steam, air

MASONEILAN REGULATORS

Keep Pressure Under Control!

"We heard Cleaver-Brooks Boilers were OK"

. . . and what an understatement that proved to be for a Milwaukee petroleum marketer*



Cleaver-Brooks 500-hp boiler is used for processing petroleum products — heating kettles, tanks — and for drum washing.

Look at the record:

350 gallons of fuel oil saved per day!

On an annual basis — that's more than 90,000 gallons of oil saved.

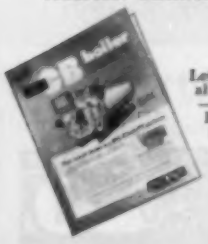
Complete shutdown flexibility with the assurance of fast steaming from a cold start is the key to these remarkable savings for a petroleum processor and marketer in Milwaukee, Wisconsin. Now, a Cleaver-Brooks 500-hp boiler operates 10 hours a day, 5 days a week, where formerly two 150-hp units operated continuously 24 hours a day, 7 days a week. Fewer boiler working hours also saves up to $11,000 yearly in maintenance.

By replacing outmoded equipment, this petroleum processor also enjoys the benefits of guaranteed 80% operating efficiency, four-pass design, forced draft, 5 sq. ft. of heating surface per boiler-hp and fully-automatic firing. Cleaver-Brooks Company, Dept. M, 305 E. Keefe Ave., Milwaukee 12, Wisconsin — Cable Address: CLEBRO — Milwaukee — all codes.

**Name supplied upon request.*

Look at these "before-and-after" facts

	NEW (1) 500-hp Cleaver-Brooks boiler	OLD (2) 150-hp obsolete boilers
FUEL CONSUMPTION	430 gal. per day (10-hr. day) 46 gal. per hour (operating hour)	800 gal. per day (24-hr. day) 60 gal. per hour (operating hour)
SCHEDULED STEAM SERVICE	Automatic firing from 6:30 a.m. to 4:30 p.m. Fast steaming from a cold start.	Continuous 24-hr. operation. Couldn't shut down. Wasted heat. No benefit from extra hours of operation.
OVERALL EFFICIENCY	Average 125 lb. of steam per gal. of oil.	Average 96 lb. of steam per gal. of oil.
OVERALL MAINTENANCE	Cleaned every 6 months. Single maintenance foreman.	Cleaned every 6 weeks. Required extra fireman for weekends.



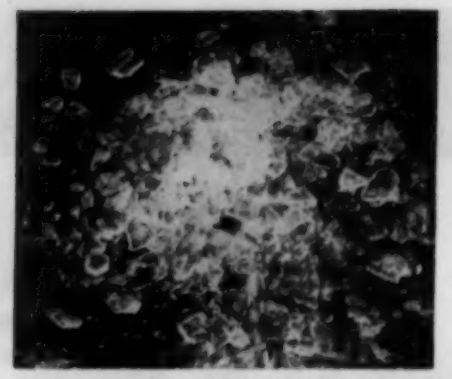
Let us help you beat the penalties of boiler obsolescence — with a modern Cleaver-Brooks installation. Sizes from 15 to 600 hp, 15 to 250 psi — steam or hot water, for heating or processing. Write for catalog.

Cleaver Brooks 25th YEAR

TWENTY-FIVE YEARS OF LEADERSHIP BY THE ORIGINATORS OF THE SELF-CONTAINED BOILER

Institutions of All Sizes Find Shell-Ice Saves Money

Shell-Ice Being Blown into the Hold on a Fishing Vessel at Velasco, Texas



Shell-Ice Consists of Solid, Slightly Curved Pieces, and With Average Good Water Is Clear

HARVEST NEW PROFITS with FRICK Shell-Ice*

Shell-Ice Can Be Scooped, Shoveled, Bagged or Conveyed.

Pair of 20-Ton Shell-Ice Makers in Operation

This new kind of ice is frozen automatically on stainless-steel tubes—no labor, no crushing, no snow, waste or special cleaning.

Shell-Ice is ideal for use in cooling drinking water and beverages, bottled milk, fish, poultry, fruits, vegetables, displays, trucks, etc., etc. Pieces are ⅛ to ½ inch thick, as desired: ¼-inch ice is harvested every 10 minutes.

Shell-Ice Makers can be connected to your existing refrigerating system, if preferred, since they operate on direct-expansion refrigerant. Built in 12 sizes, making ½ to 30 tons of ice per 24 hours. Small floor space required. Many already installed.

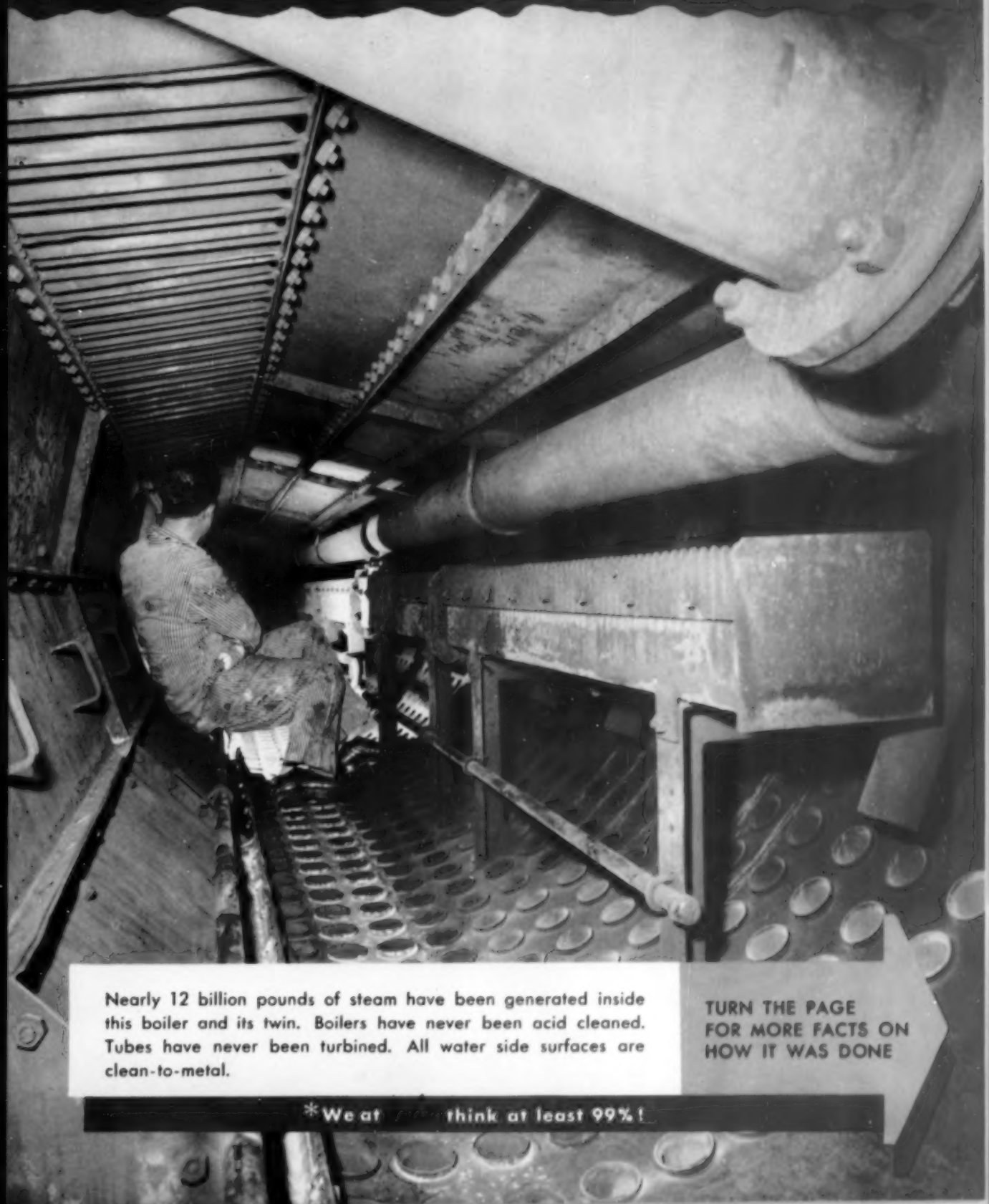
Get the full facts and figures: ask for Bulletin 54 today. *Trade Mark

DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO, PENNA. U.S.A.

Proof of PERFECT* Water Treatment PERFORMANCE



Nearly 12 billion pounds of steam have been generated inside this boiler and its twin. Boilers have never been acid cleaned. Tubes have never been turbined. All water side surfaces are clean-to-metal.

TURN THE PAGE FOR MORE FACTS ON HOW IT WAS DONE

*We at think at least 99%!

BOILER OPERATING DATA

● Two new boilers were put on line in a Southwestern municipal utility plant at the same time late in 1949. Rated capacity of each unit is 250,000 pounds of steam per hour at 950 p.s.i. Normal operating rates range from 150,000 to 175,000 pounds of steam per hour per unit.

The Nalco System of water treatment has been used continuously in these boilers. Raw water softening is by Nalcite* Ion Exchange Resins, and other Nalco products are used for after-treatment, internal treatment, and condensate return line protection. Results have been perfect. Boilers have never been turbined or acid cleaned, and are opened only for annual internal inspection.

Registered Trademark

CLEAN . . . FOR TOP HEAT TRANSFER EFFICIENCY
What appear to be chalk marks in this unretouched photo are scrape marks which indicate only the usual powdery film left on the metal when the boiler is drained.

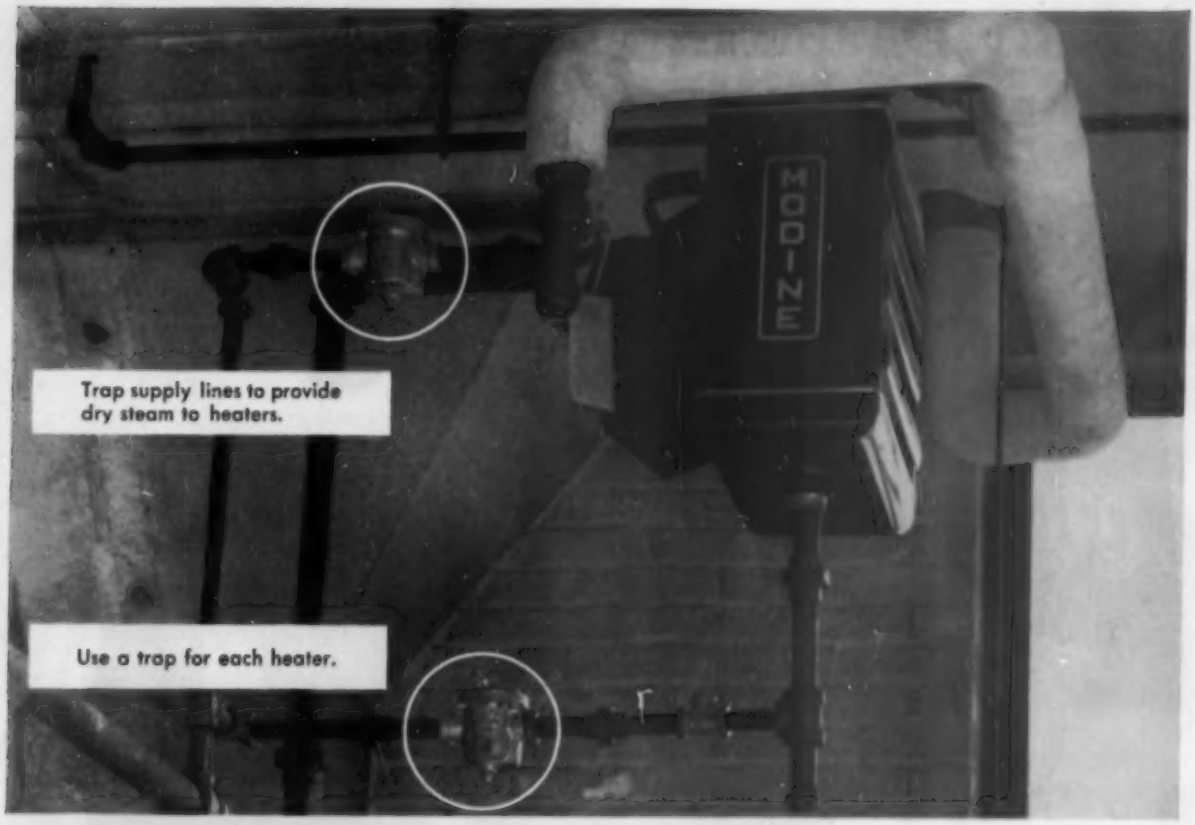
AND THE MUD DRUM IS SPOTLESS, TOO!
Another unretouched photo inside the mud drum of one of the boilers shows the like-new condition after years of service. No deposits or corrosion of any kind have been found in tubes or drums.

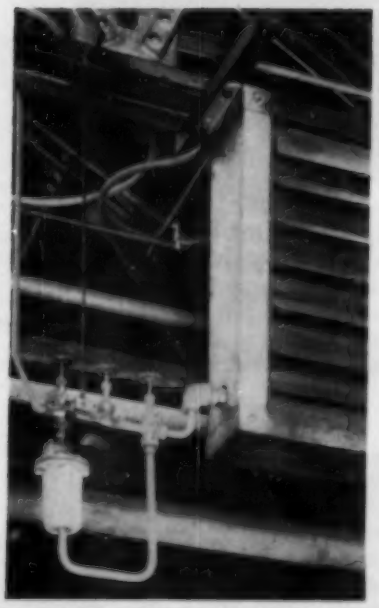
Nalco ON THE JOB

● Results like these are encountered every day in plants when the complete Nalco System of water treatment is on the job. The Nalco System is adaptable to old and new plants of any capacity, temperature, or pressure. Whether you operate a public utility or a space heating boiler, you will find your Nalco Representative of real assistance in the solution of your water treatment problems. Call him today, or write for full information.

NATIONAL ALUMINATE CORPORATION
6216 West 66th Place • Chicago 38, Illinois
In Canada: Alchem Limited, Burlington, Ontario

THE *Nalco*® SYSTEM . . . Serving Industry through Practical Applied Science





Use a bypass above trap where heater must be kept in operation at all times. Note neat hookup possible with Armstrong vertical connection trap.

Tips on Trapping Unit Heaters for Full Output and Low Maintenance

• If unit heaters are clean and the steam supply and return lines are adequate, their performance will depend entirely upon the steam trapping. Here are some trapping pointers to insure plenty of heat when it is needed:

1. Trap supply lines to take care of condensate formed by radiation loss.

2. Use one trap for each heater. Two or more heaters drained by a single trap will fail to deliver maximum btu output.

3. Size traps properly. Many a unit heater is handicapped by a trap lacking adequate condensate and *air* handling capacity. The few dollars extra for larger traps insure fast heatup, full output and freedom from coil corrosion.

4. Install traps correctly. Put trap below and close to heater. Install a bypass around the trap if the heater must be kept in operation at all times. A shut-off valve in the discharge line facilitates trap inspection. Use of check valves and strainers is dependent upon piping conditions and the traps used.

5. Protect against PRV failure where freezing could occur. Sometimes heaters supplied with reduced pressure steam are installed where freezing could occur if traps failed to open. In this case select traps that will open at maximum steam supply pressure and still have adequate capacity at reduced pressure.

FREE ON REQUEST—COMPLETE INFORMATION on the above points, diagrams, selection data, tables and additional recommendations are contained in Armstrong Bulletin No. 2312. Also includes BTU output ratings for all models of 30 makes of unit heaters. Call your local Armstrong Factory Representative or write:

ARMSTRONG MACHINE WORKS
936 Maple Street • Three Rivers, Michigan

STEAM TRAPS FOR EVERY REQUIREMENT — APPLICATION ENGINEERED

ARMSTRONG STEAM TRAPS

Only Chapman Tilting Disc Check Valves give you

FAST TIGHT QUIET CLOSURE

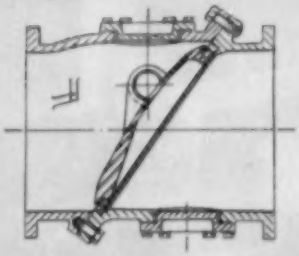
Fast, quiet operation means low cost operation for check valves. That's exactly what the Chapman Tilting Disc Check Valve is designed to do. It won't flutter or slam and damage the piping joints or the valve itself. The unique drop-tight closure action eliminates scraping and wear of the disc and seat.

Rugged construction and low wear of the Chapman Tilting Disc Check Valves mean long life under severe operating conditions. Absence of vibration plus low head loss keep maintenance of the entire piping system at a minimum.

Whether for replacement or for new piping systems, be sure to specify Chapman Tilting Disc Check Valves. They're available in iron and steel for handling fluids or gases under a wide range of pressures. For full data on the complete line, write today. Ask for Catalog 30-A.

The Chapman Valve Mfg. Co.
INDIAN ORCHARD, MASSACHUSETTS

Here's why Chapman's Tilting Disc Check Valves Keep Quiet All of Their Lives



This specially designed "airfoil" disc balances perfectly in open position. The fluid holds the disc tightly against its stops without flutter. The body of the valve is larger around the disc, so the net valve area is at least as much as the pipe area to assure low flow resistance.

When the flow is reversed, pressure against the upper part of the disc cushions it as it closes. Then the disc drops easily and tightly to its beveled seat after the valve has swung closed. Seating is fast and quiet with minimum head loss in all but unusual piping arrangements.

TIMELY COMMENTS

SOUTHERN POWER AND INDUSTRY

Report on the Geneva Atomic Energy Conference

By
JOHN F. LEE
Consultant on Atomics
for
Southern Power & Industry

Mr. Lee, Professor of Mechanical Engineering, North Carolina State College, lectured at Cambridge University this summer and attended the Geneva Conference as an observer.

THE FIRST International Conference on the Peaceful Uses of Atomic Energy, sponsored by the United Nations, was held at Geneva, Switzerland, from August 8 to 20. In terms of human contacts, promotion of freer exchange of technical information and the establishment of new contacts for future international trade in the atomic energy field, the conference was generally regarded as a tremendous success. Those who expected the release of startling new scientific ideas, or firm orders for equipment related to atomic energy uses, were somewhat disappointed in the outcome of the conference.

When it is recalled that the basic purpose of the conference was the promotion of the peaceful uses of atomic energy through an exchange of related scientific information, it is not at all surprising that the commercial aspects of the conference would be disappointing to those whose principal interests lay in this area.

American firms labored under severe restrictions imposed by the AEC on their foreign business transactions. Furthermore, it was quite clear that American industrial representatives made a conscious effort to avoid commercial tactics which could be criticized as dollar diplomacy. As a result, American industrialists, engineers and scientists made an impressive showing and created an atmosphere of goodwill which will pay huge dividends in the long run.

As to the revelation of spectacular scientific information at the conference one could hardly expect very much since most of the secret information relates to the military uses of atomic energy, a subject not considered at Geneva. Nevertheless, a large body of scientific know-how was revealed and the delegates from the smaller nations appeared to be quite pleased with what they learned.

Scientific Exhibits

There were two exhibits at the conference. The scientific exhibitions, of a non-commercial nature, intended for experts, and sponsored by the participating governments were shown in the Palais des Nations which houses a large assembly hall where the conference was held. These exhibits were of a strictly technical nature with no commercial overtones and consisted principally of photographs, films, demonstration boards, flow diagrams, models, books, pamphlets, some items of equipment and samples of various ores.

A temporary structure erected outside the Palais des Nations housed the 10-kw American research reactor which was sold to the Swiss Government at the end of the conference. The U. S. exhibits were generally conceded to be the most comprehensive and, by far, the most impressive ones shown at the conference. Besides the United States, the governments of England, France, Russia, Canada, Belgium, Holland and some of the Scandinavian countries presented scientific exhibitions in the Palais des Nations.

Eighty-three industrial firms and other technical organizations contributed directly to the official United States scientific exhibit at the Palais des Nations. Among these organizations three came from the South including Radiation Research Corporation of West Palm Beach, Florida, the Oak Ridge Institute of Nuclear Studies, and the Oak Ridge National Laboratory.

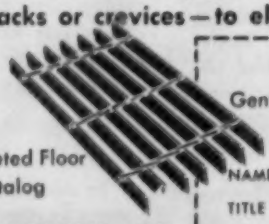
Commercial Exhibits

In addition to the scientific exhibitions there were commercial exhibits at the Palais des Expositions located on the opposite side of the city from the Palais des Nations where the conferences were held. Space was rented for

(*Continued on page* 98)

Q. Where can I find an inexpensive, light, fireproof, completely ventilated flooring?

A. BORDEN ALL/WELD floor grating in this installation furnishes all the above features — PLUS — it is self-cleaning and Borden All/Weld floor grating is solidly welded without cracks or crevices — to eliminate corrosion.



Write for complete information on BORDEN All/Weld, Pressure Locked, and Riveted Floor Gratings in this FREE 8-page catalog

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INDUSTRY SPEAKS

Manpower Needs Increasing Faster than Supply

Abstracted from the comments of **Harllee Branch, Jr.**, president of the **Edison Electric Institute**, and president of **Georgia Power Company**, at a round-table conference of public utility industrial relations men on Sept. 13.

OUR GREATEST problem in adjusting to the age in which machines run machines may be in the training of management.

The decisive factor in selecting executives in the future will be more and more the breadth and depth of executive judgment, the superior ability to handle qualitative rather than quantitative factors, and the capacity to inspire and lead others in truly creative endeavors. The growing need for breadth as against specialization has brought about a surprising degree of agreement on the need for more emphasis upon the liberal arts in college training. The study of the humanities, of literature, art and philosophy, is startlingly more pertinent and practical today than some of the advocates of purely vocational preparation have been willing to concede.

I hope you will understand that I am not discounting the need for technically-trained engineers, accountants, financial men and so on. As a matter of fact, men of the highest technical training will be needed as never before. What I am trying to say is that our technicians will have to possess broader qualifications than mere technical competence.

As more and more of our work is taken over by machines, there is a growing realization that the executives who run our companies and who cannot be replaced by machines must be men of broad vision rather than of narrow specialization. Machines have marvelous abilities to count, to compute, to measure, to exercise routine judgment, and to regulate processes. But machines, ingenious as they are, will never be able to sense the unspoken disappointments of our customers, the unsatisfied aspirations of our employes, or the unfulfilled desires of the general public. They will never be able to erect social, economical and political standards to which the wise and honest can repair. They will never be able to instill faith, courage and hope in others by the example and inspiration of their own conduct. For such tasks we will still need—perhaps more than ever before—men of the highest degree of humanity.

Attracting Needed Talent

On the basis of industry forecasts, it appears that our industry's installed generating capacity in 1965 will be about 215,000,000 kilowatts, or double today's figure.

I am sure we will find answers for the problems connected with this almost fantastic growth, but we need to remind ourselves that the men who will solve 1975's problems, with four times today's capacity and kilowatt-hour generation, will not be hired in 1975. We employed them last year, or this year, or will employ them next year. For 1975, the die is already cast insofar as our manpower potential is concerned.

What we need to be seriously concerned about now, before it is too late, is the availability of enough properly-trained engineers to carry on our business in the years beyond 1975. It is an alarming fact that the number of first-class engineering students interested in going into the utility business is declining almost as fast as the industry is expanding. If this development continues, our progress may come to a halt.

The first reason, of course, why companies are suffering from a shortage of engineers is because there just aren't enough engineering graduates to meet all of the present and heretofore unpredicted needs of American industry. This problem will grow more acute when the effects of automation are felt more widely, bringing about an upgrading in the requirements for employes to operate and maintain the new and complicated machines now being made ready for general business and industrial use.

We are also finding it difficult to meet our needs for engineers because the electric utility industry has not made itself look attractive enough as a place of employment to young men of energy and imagination.

The fact that the utility industry does not appear to be glamorous to these young men is largely our own fault. We have not done a good selling job. It seems to me that a business which will be in the forefront of the atomic age and one whose services are expanding so greatly that it doubles in size every ten years ought not to be so lacking in glamour that the young engineering graduates should pass us by.

13.2 kv leaving main sub station and entering primary underground distribution.

Main primary distribution breaker housings, the tops of which are visible in left photo.

Underground Cable is Important at Oerlikon—a Somewhat Unique North Carolina Plant

Electrical Distribution System

By ROBERT U. GARRETT
Chief Electrician
Oerlikon Tool & Arms Corporation
Asheville, North Carolina

THE PLANT of the Oerlikon Tool & Arms Corporation of America (subsidiary of Oerlikon Machine & Tool Works of Zurich, Switzerland) is located in the mountains of Western North Carolina, between Asheville and Swannanoa. Its 25 or more buildings, scattered over a hilly area and nestling in Swannanoa Valley, do not give the impression of the conventional industrial plant. However, the site was chosen with great care and its development ties in with a long-range project.

Almost isolated as the plant is from densely populated areas, its manufacture of nitroglycerine, explosive propellants for rockets and their attendant ignition devices and assemblies can be carried on with the very minimum of danger to the surrounding area, and its widely separated buildings almost preclude any extensive damage in case of an untoward catastrophe.

In a national emergency, with the minimum amount of construction, the vital points and processes could go completely underground, to be camouflaged and protected.

Electrically, the installation is quite unique in that all primary and secondary distribution is underground, with the exception of the incoming hi-line to the substation, located well away from the hazardous boundary line and approached from the opposite direction.

Carolina Power & Light Company comes in overhead, on single pole construction, with 66 kv, 3 phase, 3 wire delta. Three 1500 kv-a's, plus a standby, step this down to 13.2 kv, 3 phase, 4 wire wye.

One leg is used overhead for a few hundred feet of 7200 single phase, to supply four temporary buildings which house administration with 115/230 for both lights and heat. Also for control circuits.

Loop Distribution

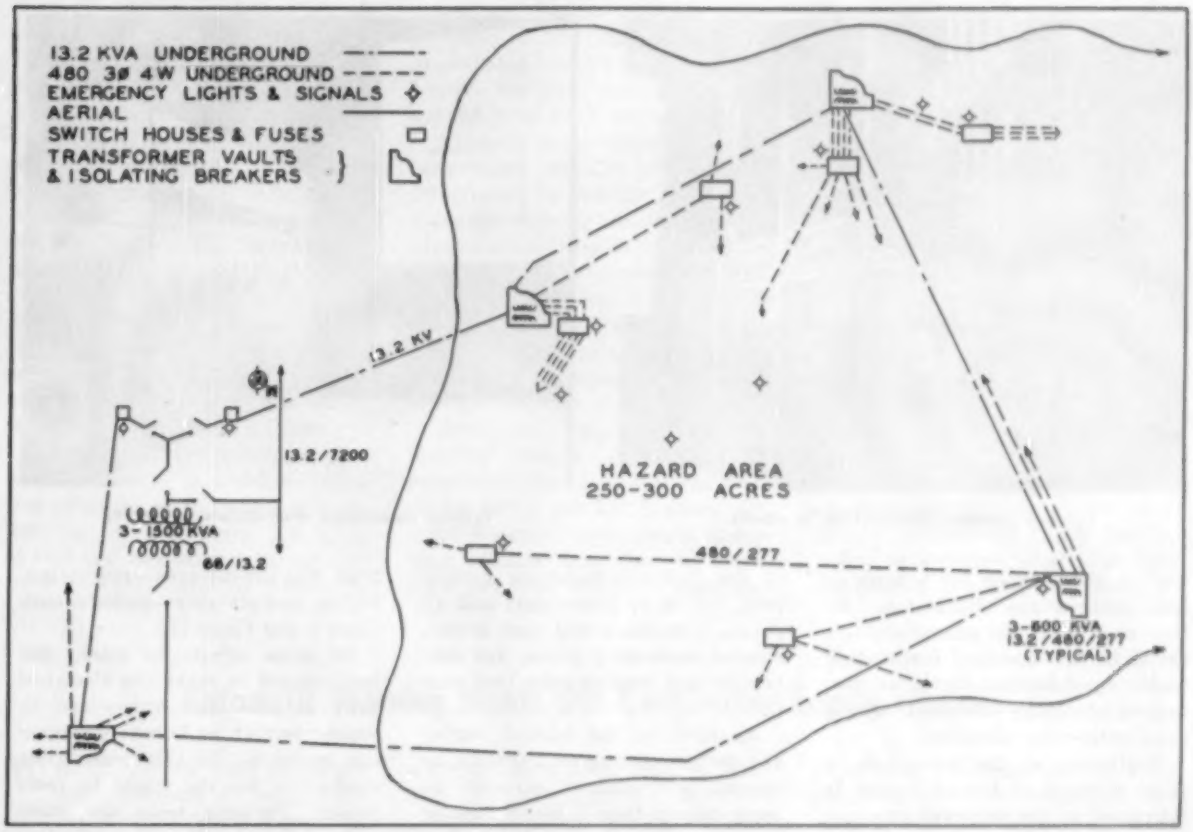
Immediately adjacent to the central sub are two 600 amp oil breakers, remote controlled, individually housed, from which 13.2 kv takes off underground two ways to completely encircle the hazardous area with a loop distribution circuit.

Nearly 4 miles (20,988 ft) of 3 conductor, 70 mm² (138,400 cm) oiled paper, spirally wound, aluminum static stress tape, oiled linen, lead, jute, double armour, gutta-percha and jute direct burial cable terminate and leave again at four major sub-sations. As far as now known, this is the most extensive installation of its kind in the South.

Substations

Isolating oil breakers, dead front manually or automatically operated, protect each run both ways, enabling each station to be isolated or fed from either direction—an extremely flexible hook-up from a maintenance standpoint.

One feature of the breakers not ordinarily found is a thermal overload device in one leg in addition to the current overloads in the other two legs. Also, there are no automatic re-sets, necessitating manual



Schematic Diagram of Electrical System.

closing. On a short circuit, the factory specifications give them a one cycle operation rating.

Each sub-station houses three 3 phase, 600 kva 13.2/480/277 delta primary, wye secondary transformers, two working and one standby. In passing, it might be mentioned that each of these is a small, neat, compact one-package job in oil, 42 in. high, 54 in. wide, 34 in. deep, with casters and rail mounted. Each is bricked-in in its own isolated cubicle, with access door opening to the outside of the building.

Isolating breakers, both primary and secondary, dead front and screened, make routine inspection and cleaning an easy chore. Tubular primary bus and squeeze fittings make not only a very neat appearance but should assist materially in quick and easy replacements. (May one never happen!)

Secondary Distribution

On the other side of the vault room, rectangular copper bus (incidentally, home-fabricated) delivers 480/277 onto pre-fabricated square bus with completely dead front breakers and safety pull-out fuses. Instrumentation is sunk flush.

Some breakers lead directly to their own buildings; others feed six switch houses, where fused circuits split up to other smaller buildings.

Over two and a half miles (14,553 ft) of oiled paper, lead and jute covered cable for direct burial, compose a rather extensive distribution network, all 3 phase, 4 wire. Cables range in size from 16 mm² (33,100 cm) to 300 mm² (600 mcm) and all runs leave and terminate in poured-in pot heads.

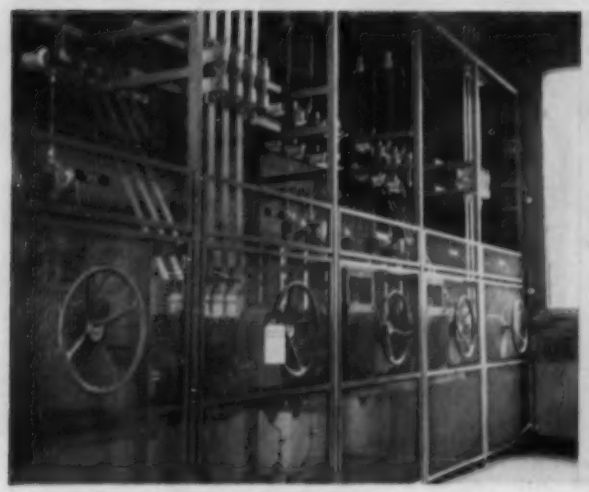
Locating Cable

It was found necessary to do some drainage excavation near the 13.2 cable, and the plot-site map showed the run to be 30 or more feet away. Pick-digging was proceeding normally when a small section of hell broke loose. The pick-point with 200 pounds of man behind it punctured the cable. Thanks to the grounded lead sheath, a dry handle, and instantaneous breaker action, no injury was suffered by the digger other than a very bad scare. But it became immediately advisable to re-check on all cable locations, and pin-point them as closely as possible.

The market was scoured for a suitable device, but it seemed that none was available under $5-600 to locate cable 3 to 5 ft down. The electrical unit and the electronics lab pooled ingenuity and resources and came up with an impulser, a pick-up coil and a transistor amplification hook-up, all home grown and at less than $50.00 in cost.

The portable assembly weighs less than 4 lb, is walking-stick mounted and gives very good results even at 15-25 ft depth. Theoretically it should assist in fault locating but no occasion has arisen to date to try it. Plot-site corrections are proceeding and a few woeful discrepancies are being corrected.

The ancient question of "ground-



Typical primary distribution in vaults.

Typical secondary distribution in vaults.

ing" is always good for a more or less acrimonious discussion. Be that as it may, the procedures followed in the electrical installation under consideration have, so far, proved absolutely trouble-free and apparently very effective.

Beginning at the main sub, a close network of buried copper is connected to the midpoint wye and also onto the fence. It reads less than 25 ohms. Two 4 ft square copper plates buried 8 ft deep tie onto the two 13.2 lead sheathes. At each sub-station this lead is tied into the bus structure, which in turn ties in with the water pipe distribution, for equipment ground.

The midpoint wyes from transformers are grounded by 6 ft square copper 8 ft deep in moist clay. Midpoint then goes insulated to the farthest motor or control push button or disconnect; and all points in between and each device, current consuming or not, are electrically and mechanically tied onto it.

As 80% of the control wiring and devices operate on 280 volts, an insulation breakdown presents no more hazard than a blown fuse or a ruptured breaker; and a broken conduit run still maintains its continuity.

Safety Precautions

In the operating area, all the installation is built for Class I and Class II hazards. Nitroglycerine manufacture and processing conform in every way to Class I construction, even to fluorescents and the lowest voltage signals and controls. The powder area—processing, drying, and pressing—includes both Class I and Class II.

No pains, efforts, or money has been spared to make the electrical work as safe and secure and as nearly perfect as human endeavor can make it. In this connection, conductive flooring might be mentioned. Periodic tests are made with a "megger" and conductive wax only is used. Special clothing is prescribed and only non-sparking tools are used.

Lightning Protection

Grounding also brings up the question of lightning protection. For some, so-far-unaccountable reason, the valley is "lightning-prone." Several strikes a year, both on timber and directly into the ground,

Typical switch house in field.

Access doors to transformer cubicles.

occur. To counteract this effect, all buildings have, in as far as possible, been turned into "Farraday Cages" or similar enclosures.

The small storage buildings are entirely of pre-fabricated metal construction and therefore presented no problem. After the sections had been bolted together, the members were welded at strategic points, pointed at every gable and a buried counter-poise of 2/0 copper was laid completely around the building. Vertical runs at every corner tie in with this counterpoise, as do all sides of the buildings, with brazed connections.

The processing buildings presented more of a problem. This was attacked in the same way by pointing to cover every 900 sq ft of roof and also at each corner and gable. This building counterpoised and tied in with the water system. In addition, all incoming or outgoing metallic lines have been bonded together and additionally grounded by 10 ft driven rods.

At every point inside the buildings where metallic continuity is interrupted by flexible connections there are special bonding jumpers around these breaks, with the result that no metallic point has a resistance higher than 1 to 2 ohms to the ground. Periodic tests with fresh reference grounds have been made a part of the preventive maintenance program.

There are three more items of possible interest. Heating in the hazardous area is all electric. Nine 75 kw and 4 100 kw, 3 phase, 480 volt "Wiegand" units supply underfloor radiant heat for six buildings, and three buildings (one non-hazardous) have hot water radiators, a total electric heating load of 1575 kw. Heat is "Modutrol" controlled. In addition, there are a 1000 kw, 480 volt, 3 phase water heater with 9 control steps and a 750 kw, 480 volt heater in 4 steps for process water heating.

There is an emergency standby 86 kw, 3 phase, 480 volt diesel-driven asynchronous generator, requiring no separate excitation or collector ring assembly.

In the powder pressing building full automation, in as far as practicable, has been carried out. Over 50,000 ft (nearly 10 miles) of #16 TFF 600 volt control wiring has been pulled in. Over 300 relays, agastats and Skinner valves click in and out like one happy family.

We, at Oerlikon, feel that this installation is somewhat unique.

Automatic Warning Heads Off Compressor Engine Troubles

WATCHDOG of Gulf Interstate Gas Company's compressor stations is the Foxboro Segmental Dynalog, a recorder which logs a continuous chart record of compressor engine exhaust temperatures. An invaluable maintenance aid, it not only permits gradual overheating to be spotted, cylinder by cylinder, but automatically shuts down the engine before excessive temperatures can damage a unit.

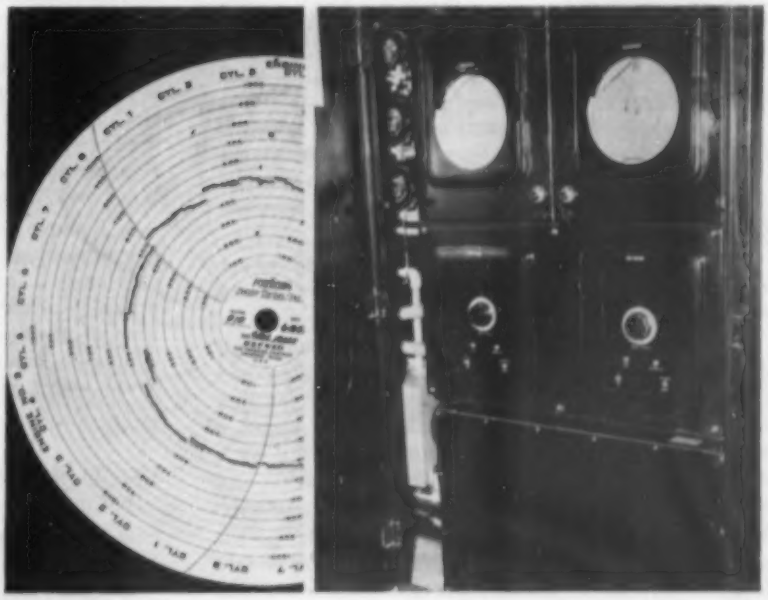
Recording Points

Recording 24 points in sequence, a single instrument guards either four 6-cylinder or three 8-cylinder engines. Temperatures are sensed by thermocouples installed in the engine. With the instrument is a switching panel so that the automatic sequence can be interrupted and any point spot checked. The recorder chart is graduated from 0F. to 1000F., with a separate segment for each of the 24 cylinders to be watched.

Electrical Rotax contacts in the instrument provide the alarm and shut-down functions. If a cylinder exhaust temperature falls to a predetermined low point, the contacts "make," setting off an alarm to warn the maintenance crew of possible misfiring. If the pen hits a high setting, another alarm is actuated and the engine shut down.

Used at every station on Gulf Interstate's Louisiana - to - Kentucky gas transmission line, the instruments have simplified the maintenance job, helping to spot engine troubles before damage.

Chart record taken during a typical eight-hour shift at Gulf Interstate's Station, Rayne, Louisiana. The temperature of each cylinder is checked once every 12½ minutes. Temperature trends show whether each cylinder is operating at full efficiency. Mounted on panel, Foxboro Segmental Dynalog Recorders (top) and switching panels (below) keep continuous check on exhaust temperatures.



How to Get Longer Life from Your Rolls

By DAVE KUNIHOLM
Mgr., Industrial Rolls Div.
Rodney Hunt Machine Co.

Inspect rolls daily for punctures, scratches and cuts.

Paper, textile, chemical, plastic, and other manufacturers can reduce roll maintenance

GOOD care will prolong the life of many types of rolls being used in normal service throughout industry.

Regardless of the type of roll, good care begins with good handling practices. Extreme caution should be exercised when uncrating a roll to avoid damage to the roll surface by hammers, pinch bars, or other tools. When removing a roll from its crate always rest the roll on the journals; avoid contact of the surface with the floor where chips or foreign matter will gouge the surface.

When moving a roll by slings attached to the shafts, be extremely careful to prevent the chains from fouling the shafts or the ends of the working face of the roll. Place a piece of rubber or leather belting between the chain and the journal and a block between the chain and the working face to prevent contact with the chain. The recommended method, if the rigging is available, is to use a broad belt sling around the middle of the roll.

The maintenance hints presented in this article for a number of specific types of rolls will enable paper, rubber, plastic, textile and other manufacturing plants to save money on roll replacement.

STAINLESS STEEL ROLLS

Care in Use:

1. The corrosion resistance of stainless steel is due to the formation of a chromium oxide film on the surface. Between operations wash and clean the surface and allow it to dry. Drying permits the reformation of the oxide film.

2. Clean with a soft cloth and warm soapy water. Follow with a thorough rinse in clear water, drying with a soft absorbent cloth.

3. Do not use steel wool to clean the surface. Small particles of steel will imbed in the stainless steel and form rust. Where an excess accumulation of dirt requires more effective cleaning than soapy water, a 10% solution of sodium citrate may be used on a moist cloth, sprinkling on a light dusting of whiting and rubbing the dirt, rust or stain marks vigorously. Follow with a thorough rinsing and drying.

4. Any welds on a newly manufactured roll should be passivated to re-establish the chromium oxide film. This is done by treating the stainless steel with a 20% solution of warm nitric acid followed by a thorough rinsing and drying. Where operation of the roll tends to remove the oxidizing film an occasional passivation as described will extend the corrosion resistance and life of the roll.

5. Remove greases and oils on the surface by vapor degreasers such as trichlorethylene and perchlorethylene . . . or by washing and rubbing down with organic solvents such as carbon tetrachloride, kerosene or gasoline. Any abrasives in the grease or oil should be completely removed by washing in warm soapy water, rinsing and drying.

RUBBER ROLLS

Care in Storage:

1. Cover rolls with paper to reduce oxidation.

2. Store in a cool, dark, damp place at about 50 F to 60 F.

3. Rest rolls on journals, not on rubber surface.

4. Avoid temperature below 32 F; serious damage can result from freezing.

5. Re-grind rolls if stored more than 6 months.

Care in Use:

1. Re-grind rolls often to remove oxidation and extend life of rubber.

2. Keep same pressure at both ends of roll.

3. Keep rolls from resting on rubber surface when not in use.

4. Keep rubber clean to avoid breakdown from oil, gasoline, kerosene, and other distillates.

5. Watch bearing lubrication; heat or oil transmitted from roll shaft will lead to breakdown of rubber covering.

General Information:

1. Most rubber coverings become slightly harder with age.

2. Rubber rolls are slightly harder when cold and slightly softer when hot.

3. Rubber roll surfaces will oxidize causing small cracks that will deepen; grind surface frequently to remove oxidation.

CHROMIUM PLATED ROLLS

Care in Storage:

1. For long time storage clean surface thoroughly, dry off, then apply neutral grease coating.

Care in Use:

Chromium plated rolls are designed to provide protection against wear and corrosion, and in some cases to improve the end product being manufactured. Therefore, the following precautions will help to obtain the full benefits of this versatile coating.

1. At the end of each day's run wipe the surface clean and dry. Powdered whiting with water, or a simple paste like Bon Ami, will do an excellent job. If the roll is located in a position where there can be drippage from exhaust ducts, etc., rolls should be covered.

2. If the chromium surface is accidentally nicked or scored, a hand stone should be used to rub down high spots and sharp edges.

3. If a doctor blade or wiper blade is used, be sure that there is proper adjustment between the blade and the roll, particularly at the time of starting. Should any signs of scoring develop lift the blade promptly and resharpen if necessary. If any chromium dust has become imbedded in the blade it can be detected by wiping copper sulfate across the edge. Copper sulfate will leave a reddish color on the steel, while the imbedded chromium dust will remain bright. This should be removed before the blade is put in service.

4. Avoid rapid temperature changes. Heat or cool gradually, and rotate roll, if possible.

5. Avoid injurious acids such as hydrochloric. Wash off thoroughly and promptly if accidentally applied.

6. Cover rolls with a cushioning material to avoid damage by falling objects or tools during maintenance of machine.

WOOD ROLLS

There are three general types of wood rolls.

Solid rock maple log rolls contain a maximum amount of moisture, operate wet at all times, and must always be protected against drying out.

Rolls made of air seasoned wood usually ranging in size from 3" to 9" diameter contain 15 to 25% moisture, operate under wet or moist conditions and must be protected against accelerated moisture removal.

Rolls made of kiln-dried wood contain 5 to 8% moisture, operate dry or slightly moist, and must be protected against absorbing excessive moisture.

LOG ROLLS

Care in Storage:

1. Protect metal parts with rust preventive and submerge roll in tank or canal; water should be as cold as possible.

2. Store rolls in dripping wet sawdust or wrap in several layers of wet burlap, maintain low temperature and keep wet at all times.

Care in Use:

1. Let water trickle over rolls from perforated water pipe and hang cloth or burlap over pipe to come down over sides of rolls to keep rolls wet and to prevent warm, dry air from striking roll surface.

2. When wood is worn out don't discard log rolls. Save the metal fittings, which are reusable.

AIR SEASONED WOOD ROLLS

Care in Storage:

1. Protect shafts with rust preventive, keep roll wrapped in heavy kraft paper and store in cool, damp location.

Care in Use:

1. Inspect periodically, remove any warped roll, taking a truing cut on the surface to eliminate whipping and out-of-balance condition which will loosen shaft anchorage, and return to service.

2. During idle or down periods wet rolls once a day with hose to prevent surface splitting due to wood drying out.

KILN-DRIED WOOD ROLLS

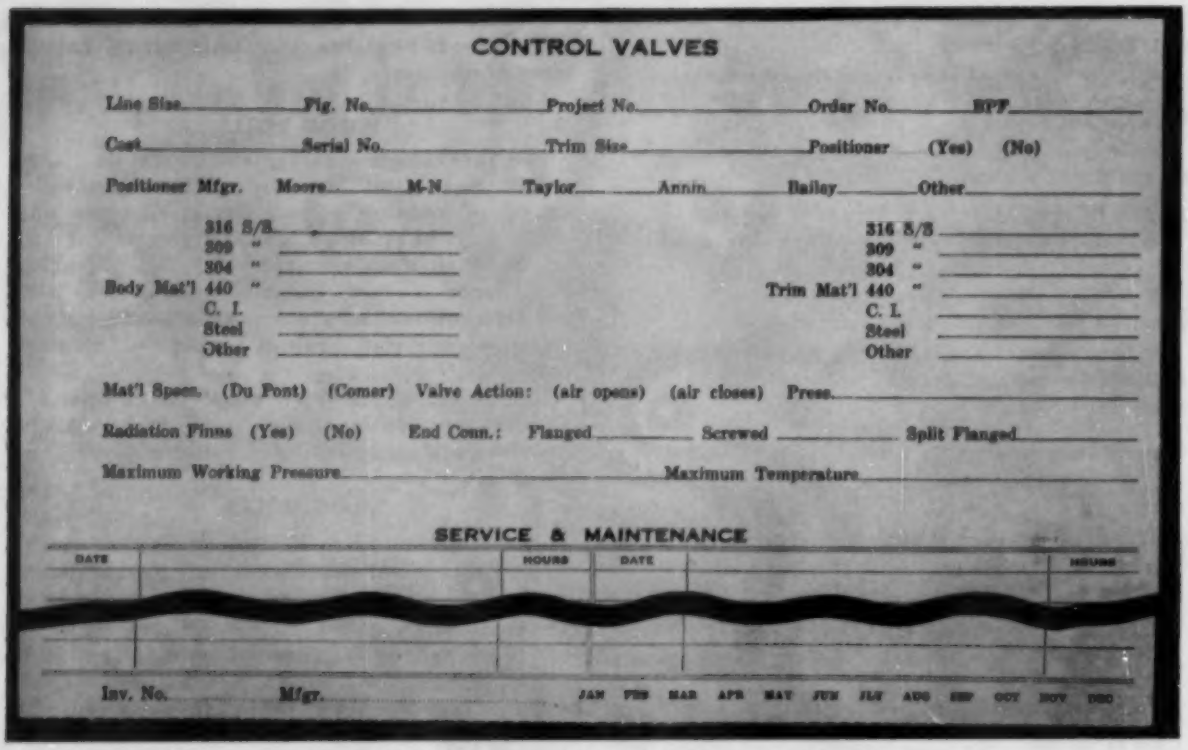
Care in Storage:

1. Protect shafts with rust preventive, wrap roll in kraft paper and store at room temperature in dry location.

Care in Use:

1. Recoat surface periodically with shellac, varnish, or other plastic type finish to seal wood pores.

2. If roll shows indication of warpage take truing cut, refinish surface and restore to service.


CONTROL VALVES

Line Size Fig. No. Project No. Order No. BPF

Cost Serial No. Trim Size Positioner (Yes) (No)

Positioner Mfgr. Moore M-N Taylor Annin Bailey Other

Body Mat'l 316 S/S
309 "
304 "
440 "
C. I.
Steel
Other

Trim Mat'l 316 S/S
309 "
304 "
440 "
C. I.
Steel
Other

Mat'l Spec. (Du Pont) (Comer) Valve Action: (air opens) (air closes) Press.

Radiation Fins (Yes) (No) End Conn.: Flanged Screwed Split Flanged

Maximum Working Pressure Maximum Temperature

SERVICE & MAINTENANCE

DATE HOURS DATE HOURS

Inv. No. Mfgr. JAN FEB MAR APR MAY JUN JLY AUG SEP OCT NOV DEC

Fig. 1. Sheet from manually posted card previously used.

Punch-Card Record System in Texas Plant

Modernizing Instrument Maintenance

By A. V. NOVAK
E. I. du Pont de Nemours & Co., Inc.
Orange, Texas

THE Instrument Division at du Pont's Sabine River Works has had in existence a detailed maintenance and inventory system for several years. This system has for its multi-purpose the record of maintenance work against each instrument in the field, a record of the current physical location of each piece of equipment, the record of detailed name plate data, and a tabulation of preventive maintenance work to be done.

Old Vs. New

For approximately four years this system has been a manual system in which data were gathered from the field and transcribed by hand to individual sheets in a Kardex file **(Figure 1)**. Although such a system is very workable and has served a very useful purpose, it was found to have certain limitations, particularly in the coordination of information for composite analysis. The system also lacks flexibility for mass accumulation of data for analyzing various difficulties.

Within the past year, it became possible to convert the entire inventory system to an IBM card punch system. This method involves the use of one master card **(Figure 2-1)** for each instrument in the field. On this card are all of the name plate information and pertinent data for reordering of like equipment or spare parts.

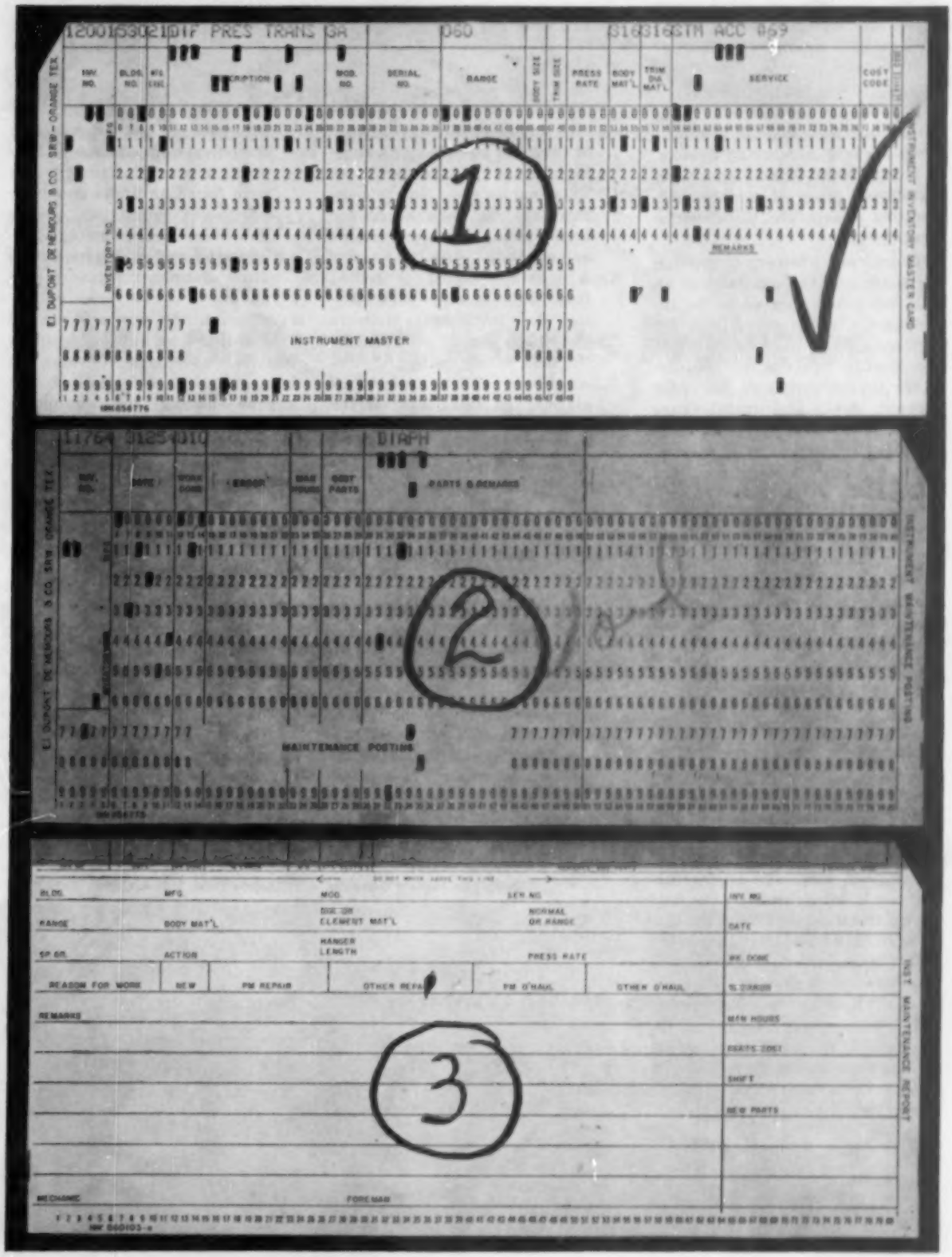
Each piece of instrument equipment (over about $100) has such a card. In general, a tag is not placed on equipment such as pressure gages and glass manometers. In a control loop there will be a card on the control valve, another card on the transmitter, and a third card on the controller.

Each master card has an inventory number in the upper left-hand corner. This same number is found on the individual instruments on a small stainless steel tag that is fastened to the instrument. These master cards are kept in a master deck by increasing inventory number.

In addition to the master card there is a maintenance posting card **(Figure 2, Center)**. This card is of a different color than the master card and has different data on it.

Each maintenance posting card

Fig. 2. Records employed in the new system. Number (1) at the top is the IBM master card. Number (2), center, is the maintenance posting card. Data for punching the above cards is taken from the maintenance collecting card (3) at bottom.



has on it its appropriate inventory number, and has space for listing maintenance work that is done on a particular instrument. This includes the type of work, man hours, and material dollars spent against that particular piece of equipment.

A space is provided for the job order account number. This number in turn will tie into the fixed asset account numbering system. It is important to note that each significant piece of maintenance requires a separate maintenance posting card.

These maintenance posting cards are punched out daily on an IBM key punch located in the Instrument Clerk's office. Data for punching these cards come from the regular preventive maintenance sheets, shift logs, job order account data, and maintenance collection cards **(Figure 2, Bottom)** from the field. The maintenance posting cards are filed in a parallel file in increasing inventory number.

Now that a master card for each instrument exists and a maintenance posting card is in the file for each piece of maintenance done on an instrument, what can be done with the system?

One of the most important services the system performs is to provide ready reference of data to the field. Approximately 30 to 40 phone calls a day are received by the clerk's office for information from these cards. Field maintenance mechanics are finding this a very useful place to check for current ranges of instruments and calibration data, and an increasing use is being made by the field of information concerning the condition in which the instrument was found at its last overhaul. It has been found that this is an important lead as to what service may be currently needed on the instrument. This prevents the mechanic from operating in the dark as to previous repairs done on this instrument.

Other Advantages

In addition to this field information the following things are being done with the system:

1) This system can quickly give a cost comparison between the maintenance on one vendor's instrument compared to another vendor's unit. This is important information for the Instrument Design Engineer for future installations.
2) This system can sort out the cost information on a given type instrumentation in one area and compare it to the cost of identical equipment in similar service in another area. This enables the areas to compare against each other for better maintenance procedures and methods.
3) A monthly report is issued from this master deck listing those instruments that are due their annual overhaul in the next 30-day period.
4) An active audit is made of all alarms and interlocks on the plant as to whether or not they were checked.
5) A very careful control can be established on the high maintenance equipment for possible replacement or certainly for other design when new equipment is being installed.
6) One of the more important uses of this system has been the use of the "Error" column on the maintenance posting card **(Figure 2, Center)**. This information has allowed the statistical computation of how much a given instrument has been found off of its true calibration. A comparison of like data from a large number of installations allows a true evaluation of units for future purchase.

Although the new mechanized system has been in service only a relatively short time, its value has been proved. It is suggested that anyone having the equipment available should look at a system similar to this for a significant assistance to instrument maintenance and design.

How to Plug Leaking Tubes

A FREQUENT problem in the chemical and petroleum industry is the plugging of ruptured or leaking tubes in condensers and heat exchangers. Tubes have been repaired by plugging with wood, solid steel plugs with a seal weld or replacing rolled tubes.

A solution to this problem is a two piece tapered tube plug, available from Elliott Company, which provides an economical and time saving method of plugging tubes (½" O.D. through 1" O.D. all gages). The tapered tube plug is also very useful for plugging tubes in experimental work where it is required that removal of the plug should not damage welded or rolled tubes.

By W. G. Adams, Maintenance Supervisor
Monsanto Chemical Company, J. F. Queeny Plant, St. Louis, Mo.

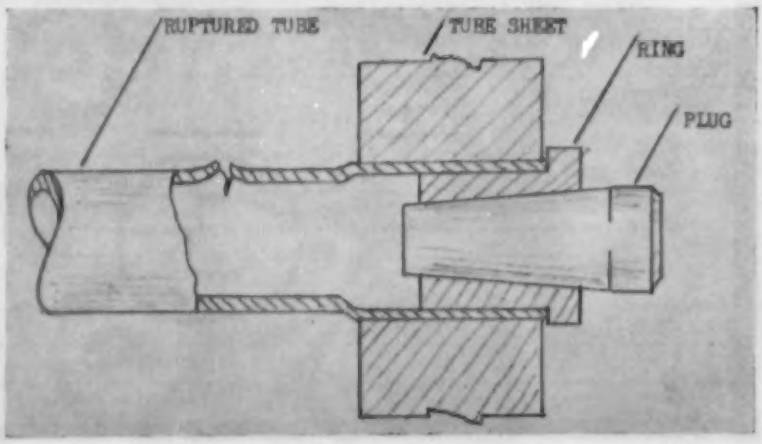


Fig. 1: The plant was originally designed for aircraft production, but was successfully converted by American-Standard to fit their increased production needs.

In Semi-tropical New Orleans Vitreous China Plumbing Fixture Plant

Air Conditioning Assures Production

By
W. N. FITZCHARLES, Sales Engineer
F. J. Evans Engineering Company
Houston, Texas
and
M. K. ROHRS, Development Engineer
Kathabar Division
Surface Combustion Corporation

WHAT happens when a company, to quickly increase production capacity, leases a war stand-by plant unsuited initially in design or location for its new product? How are these problems solved?

Originally the plant was designed for aircraft production with high headroom, large unobstructed spaces. Located in semi-tropical New Orleans on the edge of a large lake it was ideal weather-wise for plane production. The new product of the plant is vitreous china plumbing fixtures. In one stage of production, clay casting and drying, the quality and rate of production demands that an exact control be maintained on atmospheric humidity at a level well below the normal in New Orleans.

How these problems were met and solved by the American Radiator & Standard Sanitary Corporation is the story of one of perhaps the world's largest industrial spaces, in volume, ever air conditioned with a central system.

In the manufacture of vitreous china plumbing fixtures such as water closets and lavatories, slip casting and drying is one of the first and most critical steps. Special clays, suspended in water to a heavy cream consistency make up the casting compound. It is poured into plaster of paris molds to form the substance of the fixture.

Water from the slip enters the interior face of the mold, passes through, and is evaporated from the exterior face. Experience has taught that the room area must be maintained at 50% relative humidity, or below, to insure a proper drying rate.

As the water is removed from

Fig. 2: This 6,350,000 cu ft space is maintained at 85 F, 50% relative humidity or below by an air conditioning system which combines effectively chemical-type dehumidification and aftercooling with refrigeration.

the slip, the slip hardens. Additional casting slip is fed into the mold from a rubber, funnel-like reservoir. One of these, attached to each mold, keeps the spaces within the mold completely filled.

Each mold is used once a day. The inventory of molds, about 2500 of all types, would have to be doubled if the molds themselves could not be dried in place by the dry air atmosphere.

Bowls and tanks are poured one day and the cast taken out the next morning for finish drying in ovens. Lavatories are poured one day and the cast put in open setters for an additional 24 hours of drying in the air before finish drying. The drying ovens are batch-type, truck-loaded. An overnight, controlled drying cycle is used.

After drying completely, the cast fixtures are inspected, sprayed with glaze and kiln-fired. Further inspection and testing precede final packaging.

Air Conditioning Loads

Slip drying, depends on relative atmospheric humidity. In New Orleans, this means that precise control must be maintained on the moisture content of the air in the drying area. Experience showed that 50% relative humidity or lower was desirable. Temperature control, for employee comfort, was established at 85 F. Conditions were to be maintained year round, regardless of outside weather.

The space to be conditioned, Figure 2, was 135,000 sq ft, 6,350,000 cu ft. The air is diffused into the space from outlets on the same level with the light fixtures. Recirculated air is picked up by the circular ducts at bench height.

Chemical-type dehumidification, combined with aftercooling maintains precise atmospheric temperature and humidity conditions for "casting slip" drying.

The building itself, Figure 1, is 1100 ft long. Exterior walls are of cinder block with brick veneer. The roof has a 2 in. wood base with asbestos shingle and stone topping. The roof and the walls are vapor-sealed. The air conditioned space, the center 1/3 of the building, is closed off with galvestos walls.

The initial air conditioning loads were determined to be:

Moisture gain (product)—10,000,000 grains of moisture per hour

Moisture gain (infiltration)—3,000,000 gr/hr

Moisture gain (people)—600,000 gr/hr

Evaporative cooling — 1,365,000 Btu per hour

Internal sensible load — 4,526,000 Btu per hour

Selection of System

A refrigeration system was first investigated. Operating costs of this type of system, it was found, would be high. The desired maximum humidity level, 50% R.H. at 85 F with 75,000 cfm of air circulated, required a delivered air condition of only 36 gr/lb. To eliminate the need for below freezing operation and subsequent defrosting problems, the refrigeration system would have to handle more air, increasing horsepower requirements. Considerable reheating would still be necessary.

Dry dessicant systems were ruled out because the huge beds of silica gel or activated alumina would not fit into the limited equipment room space. Maintenance on systems of this type would be much greater than on the system finally installed. Uniformity of delivery air conditions would be uncertain.

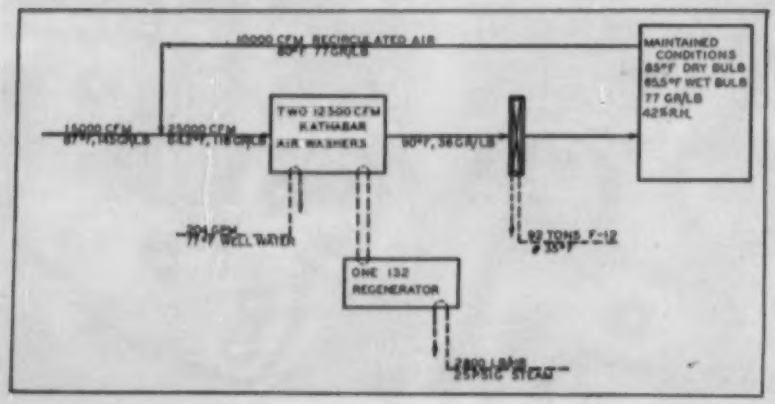
System Installed

The ultimate choice was three liquid absorbent-type dehumidification systems which combine Kathabar Humidity Conditioning units with aftercooling. A flow diagram of one of these systems is shown in Figure 3. Each system treats a mixture of 15,000 cfm of outside air (87 F, 145 gr/lb) and 10,000 cfm of recirculated air (80 F, 77 gr/lb) from 118 gr/lb to only 36 gr/lb. The aftercooling coil in each system using 92 tons of Freon 12 at 35 F, maintains temperature control.

Operation of the Kathabar system is completely automatic. The air mixture to be dehumidified is passed through air washers, Figure 4. In these units it contacts a flood of the absorbent solution, called Kathene.

The base of this solution is lithium chloride, a chemical which has a great affinity for water. Its moisture absorbing and retaining capacity is a function of its temperature and density. The cooler it becomes, the more moisture it will absorb. In Kathabar operation, the lithium chloride solution is held at a constant density and

Fig. 3: A schematic flow diagram of one of the three Kathabar Humidity Conditioning Systems which air condition the "slip drying" operation.



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. . . sprinkler system
at Collyer Wire Co., Pawtucket, R. I. . . .

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the solution temperature is varied.

In the air washer units the air to be dehumidified and the solution in intimate contact pass over cooling coils. As indicated, the coolant in these coils establishes the temperature of the absorbent solution and thus automatically the precise amount of dehumidification to be done. In these systems at American-Standard, only 77 F well water, 204 gpm for each, is necessary to obtain a moisture reduction from 118 gr/lb to 36 gr/lb.

After this dehumidification pass, the air goes into the distribution system and the solution falls into a sump. The solution is continually being circulated back to the flooding nozzles in the air washers and to similar chambers in separate regenerator units. These latter units at American-Standard are positioned immediately above the air washers, one regenerator per system. Only 10 to 15% of the total solution is circulated to these regenerators.

When the solution level in the sump rises to a predetermined level due to the moisture absorption, a valve opens and steam is passed through the coils in the regenerator units. The solution is heated as it is sprayed over the coils, and thereby gives up the absorbed moisture. A scavenger air stream in the regenerators entrains this moisture and vents it to the outside. The solution is returned to the sump in the air washer. When the sump level reaches a second predetermined level the steam valve closes automatically.

Maximum demand for the 25 psig steam used for regeneration at American-Standard is about 2800 lb/hr per system. At times over 18 tons of water is removed from the air supplied to the space per day.

These Kathabar systems operate without absorbent "carryover," a problem found in many other dehumidification systems. Carryover of any foreign matter or absorbent solution could not be tolerated in the production area.

The Kathabar systems are controlled by three recording instruments, equally spaced in the conditioned area. These reset a submaster controller which controls the rate at which the 77 F well water flows through the coils in the air washers. By this means the solution temperature and thereby the amount of dehumidification, are controlled.

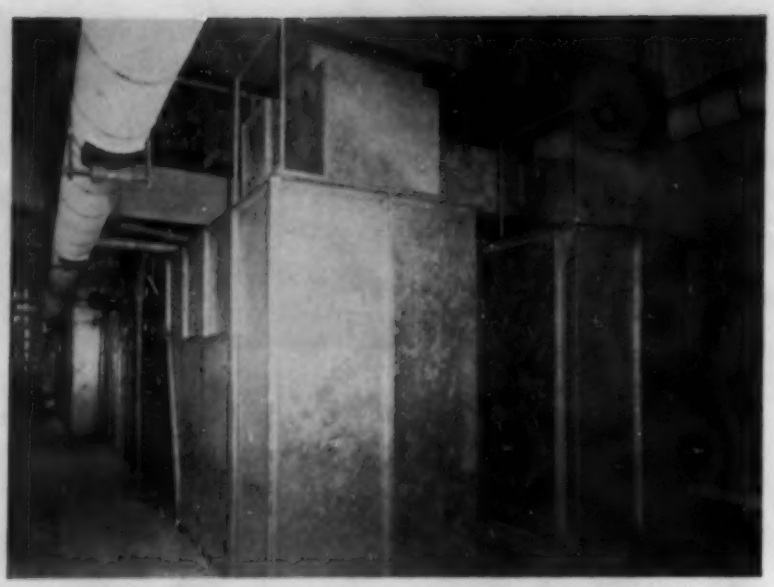


Fig. 4: The return bends on the cooling coils of one Kathabar air washer can be seen in the left background. Air filters are contained in the galvanized chambers in the foreground.

Results

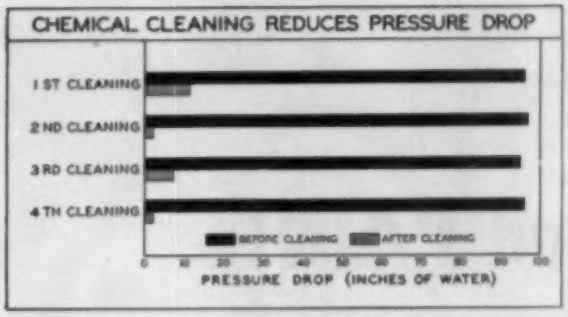
Production rates are stabilized because the air conditioning system simply and economically maintains the space continuously at the required atmospheric temperature and humidity. Drying time is a known factor. Without such assurance, additional molds as standby, or a separate, time-consuming mold drying operation would be required.

Dust Control System

A SOUTHERN plant handling phosphates had such a dirty interior condition that they were having difficulty holding manpower and there was so much dust being created at the various belt transfer points, etc., that it was hard on the moving parts of machinery as well. In addition, they were a neighborhood nuisance and pressure was being put on them to clean up the plant.

The Day Company was called in and completely engineered a dust control system which included hooding and controlling the dust at all belt loading points, belt discharge points, stationary scales and one moving scale which stopped beneath a series of silos. For this moving scale they used a patented tripper connection which is operated by pulling a lever every time the scale stops at one of the unloading spouts. A Day type "AC" filter was used on the negative side of the fan and clean air exhausted.

The results are most gratifying as the plant is clean inside and the exhausted air is free from any visible dust particles. Labor relations as well as public relations have been improved to a point where there are no more complaints.



ABOVE—Diagram showing reduction in pressure after each of four cleanings which were done in one year.

RIGHT—The pump truck is in working position. The scrubber being cleaned is the tall tower at left.

CHEMICAL CLEANING

EXTREMELY pure hydrogen is required by a southwestern chemical company for use in several production processes. The hydrogen is obtained by passing steam through a bed of white-hot coke. This produces a gas composed of approximately 45% hydrogen, 30% carbon monoxide and 25% carbon dioxide.

To separate and purify the hydrogen, the coke gas is then sent through a purification system. The final step in the system is to scrub the hydrogen in a 3 by 40 ft tower.

The only major maintenance problem in the purification system occurs in the gas scrubber. Water-deposited scale accumulates on the mild steel ring packing of the scrubber and decreases the unit's operating efficiency.

It formerly took 36 hours downtime to clean the scrubber using mechanical methods. Since it is important to hold outage time of the unit to a minimum the operator asked Dowell to develop a cleaning method that would reduce the downtime. After talking with the plant's technical section, Dowell engineers suggested that by using liquid solvents in place of scrubbing water it would be possible to clean the packing and scrub the gas at the same time.

Cleaning Procedure

A solvent line was run from a pump truck to the top of the scrubber. The scrubbing water was then cut off and solvents were started into the scrubber. The solvents discharged onto the packing and flowed down from the top to the bottom of the tower.

Solvents were pumped into the unit at the rate of 10 gpm, duplicating the original water flow. Pumping was continued until the pressure drop across the unit satisfied the customer. Then the solvent flow was stopped and the scrubber returned to normal operation with water as the scrubbing medium.

This cleaning method completely eliminated downtime of the unit. Also, the cost was only about one-third of the cost for cleaning the scrubbers mechanically. The increase in operating efficiency of the unit after chemical cleaning is illustrated in the bar chart. The four cleanings on which results are shown were done during one year.

KEEP UP-TO-DATE

- Ideas
- Methods
- Equipment

USE SPI

READER SERVICE

See Pages 16-19

In-Plant Testing Gives an Answer

MILDEW and PAINT

By R. M. WATSON
Plant Engineer
Drayton Mills
Spartanburg, S. C.

THERE are many ways of gathering information, concerning new products, etc., available to all of us. Among these are reading trade and professional magazines, attending shows and conferences, visiting other plants and of course contact with sales people. However, there is one fault common to all these; the conditions in your plant are always a little different from those in any other plant, and you wonder if that little difference will affect the performance of the product you are interested in.

In other words, you have a question in your mind—"Will this product do the job for me, under the existing conditions in my plant?" You will never get the answer to that question until you try the product in your plant, under your operating conditions.

Try It

If you are to get the answer to this question, without actually adopting the product for general use, your only recourse is to test the product under your operating conditions.

Testing, of course, is impractical in a great many instances. For example, years ago in the early days of fluorescent lighting, I conducted a very elaborate test of fluorescent tubes of four different manufacturers. At the end of the test, I knew which of the four tubes was the best. The knowledge was practically useless, however, because in the meantime all four of the manufacturers had made improvements in their products.

Yet, in other instances, it is relatively simple to conduct a running test which is always up-to-date. So it is with mildew-resistant paints.

Nearly all of us are plagued with mildew to some degree. The paint manufacturers are well aware of the extent and seriousness of the problem and are very actively engaged in trying to formulate effective mildew-resistant paints.

Fig. 1. Sample coatings on this duct are about one year old with no sign of mildew yet. When all ductwork needs refinishing, samples are examined to see which is in best condition. Sample in best condition is selected for whole job.

The problem is not a simple one. There are many different types of mildew spores. The conditions under which they exist are also many and diverse.

No two plants present exactly the same facets of the problem. An inhibitor which proves effective under some conditions, may cause a paint to yellow, or lose its whiteness, under other conditions. An inhibitor which is very effective at first may not retain its "killing power." On the other hand, an inhibitor which is not 100% effective during the first few months may arrest any further growth for the next six to twelve months.

Despite many complications, most of the leading paint manufacturers have "joined the battle," and tremendous progress has been made in the past few years.

Because of the complications, as many of us as can, should carry on a test program in order to aid in the development of better inhibitors as well as to provide the most effective formulations for our own particular conditions.

Our Problem

In our mill, which happens to

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Yarway Type "S" Seatless Tandem Blow-Off Valve. Note balanced sliding plunger design with no seat to score, wear, clog or leak. Pressures to 400 psi.

YARWAY BLOW-OFF VALVES

be an old one, practically all the manufacturing areas have central station air conditioning, and about 90% of these areas also have refrigeration. The windows are bricked-up and the roofs are insulated.

Our mildew problem is confined to those areas where we must operate under relatively high humidities. In such areas, the walls and ceilings present no problem but the air conditioning ducts offer almost ideal conditions for mildew growth.

Conditions

The apparatus serving the zones where cotton fabrics are woven operate at a dewpoint of 72 F. Saturated air at this temperature is carried into the weave room through the distribution ducts—which in our case are made of galvanized iron.

As the air enters the room and begins to warm up, the moisture content is further increased by means of atomizers located throughout the zones, until an operating condition of 80% relative humidity and 82 F dry bulb temperature is reached and maintained. At this condition the dewpoint of the air is 75 F.

Thus, the surface temperature of the main duct—carrying the 72 F saturated air, before it has time to warm up is at or slightly below the dewpoint (75 F) of the room air. Therefore, the surrounding room air, coming in contact with the duct surface is cooled to its temperature, at which, of course, the relative humidity it at or near 100%.

As a matter of fact, we have a

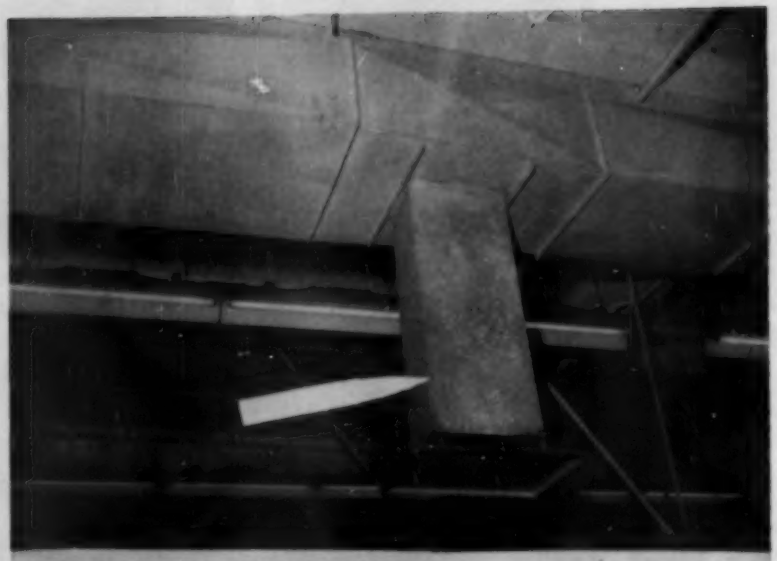
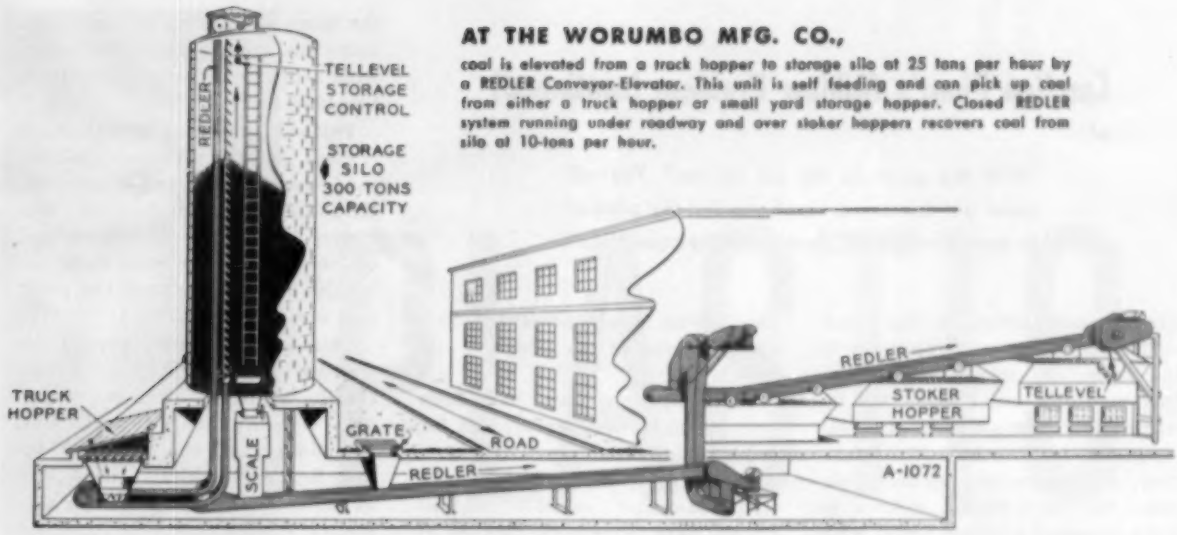


Fig. 2. After two years 90% of ductwork was mildewed about like this representative portion.

Fig. 3. Severe attack of mildew, as shown here, required two coats of finish to check.

Fig. 4. Old finish is not allowed to deteriorate excessively before new coat is applied as this view shows.



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If dustless coal handling, low operating costs and location flexibility are requirements for a coal handling system in your plant, be sure to investigate S-A REDLERS. We'll be glad to send you full information. Just fill out and mail the coupon.

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Carolina Plant's Mildew Problem (continued)

"Will this paint do the job for me? You will never get the answer until you try the product in your plant, under your operating conditions."

slight condensation on the duct surface near the entering point to the room. As mentioned before, this cool surface, surrounded by warm moist air presents an ideal condition for the growth of mildew. And since this condition obtains the year round, mildew is not a seasonal problem but is with us constantly.

In a lot of plants, mildew grows on the walls and ceilings only during the winter months when the surfaces are cooled by low, outside temperatures. Thus, in order to evaluate a mildew-resistant paint, it is necessary to wait through one or two winter seasons.

On our ducts mildew grows just as fast during the summer as it does in the winter. When these galvanized ducts were installed in 1945 they were painted with our regular mill white gloss over heavy duty undercoater. Within weeks mildew growth was very unsightly. In six months, the main supply ducts were practically "black" with mildew. By the end of one year, even the remotest ends of the branch distribution ducts were covered.

The Tests

1946—We washed the ducts with tri-sodium-phosphate to remove the mildew and repainted with a two-coat job. As soon as the finish coat hardened, we applied a wash coat of bichloride of mercury solution. This was effective for two or three months but by the year's end the condition was just about as bad as before.

1947—Again we washed the ducts with tri-sodium-phosphate. Again we repainted with a two-coat job. This time we used a high quality, synthetic resin enamel for the finish coat, hoping that the synthetic base and the hard finish would present a natural resistance to mildew. It didn't.

1948—By now, we had done quite a bit of looking around for mildew-resistant paints. My previous experience had indicated that so-called mildew-resistant paints were largely ineffective. It was impossible to sift the claims and counter-claims of various suppliers and pick the best one. However, we did pick some and repainted.

Again did a wash job and applied two coats of paint. This time we painted four individual panels of the duct, in the most critical area of the room, with four different manufacturers' mildew-resistant products. None of the paints were really satisfactory. However, our "running test" had been born.

1949—We selected the best of the four samples, which also looked better than the previous year's selection, and repainted—two coats. Seven more samples were put up.

1950—Repeat performance—another paint job, more samples. However, there were two encouraging developments this year. Paint suppliers started bringing their factory representatives around; manufacturers' chemists began visiting the mill and evaluating the samples. At the end of the year, one sample stood out above the rest. It showed less mildew-growth than anything we had tried previously, and gave the first real promise that our search would prove fruitful.

1951—We repainted again—two coats—using our "good" sample. We had more samples than ever to put up this year. (Incidentally, we were not buying samples. Manufacturers were delighted to furnish them.) This year we "discovered" a better sample. It was the same manufacturer's product, using the same basic inhibitor but with a different formulation from the 1950 find.

1952—It was still necessary to repaint, but this time — Hallelujah!—we only had to use one coat. Of course, we used the 1951 "discovery." And also as a matter of course we put up more samples. At the end of one year the paint job was still clean.

1953—For the first year since the installation of the air conditioning system, it was not necessary to paint the duct work. But, by mid-winter, the inhibitor began losing its effectiveness, and at the end of two years it was necessary to paint again. However, none of the other samples had stood up as well as the one our tests recommended.

1954—This time, about 10% of the duct had to be painted two coats. One coat was sufficient on the other 90%. We used the same paint as in 1952, in this instance Gilman's No. 154.

By this time, the number of samples had grown until they now covered quite an extensive area. Because of this, slight differences in "local" conditions were apparent, such as some samples being in closer proximity to atomizers than others. To even these out, we decided to put up two samples of each product in different locations in the room.

The samples on test now number 19, and represent the products of seven manufacturers. Some of the manufacturers have as many as six samples in the test. Each manufacturer is encouraged to have his sales representatives and chemists visit the mill and evaluate his product against the others.

The only records we need to keep are the code numbers assigned to the various samples. We do not ask for any formulas, so we are not in position to divulge any secrets. We are not even interested in prices until after we evaluate performance.

We no longer listen to sales talk—we invite the salesman to submit his sample to our test where he as well as we can see how his product stacks-up against his competitors.

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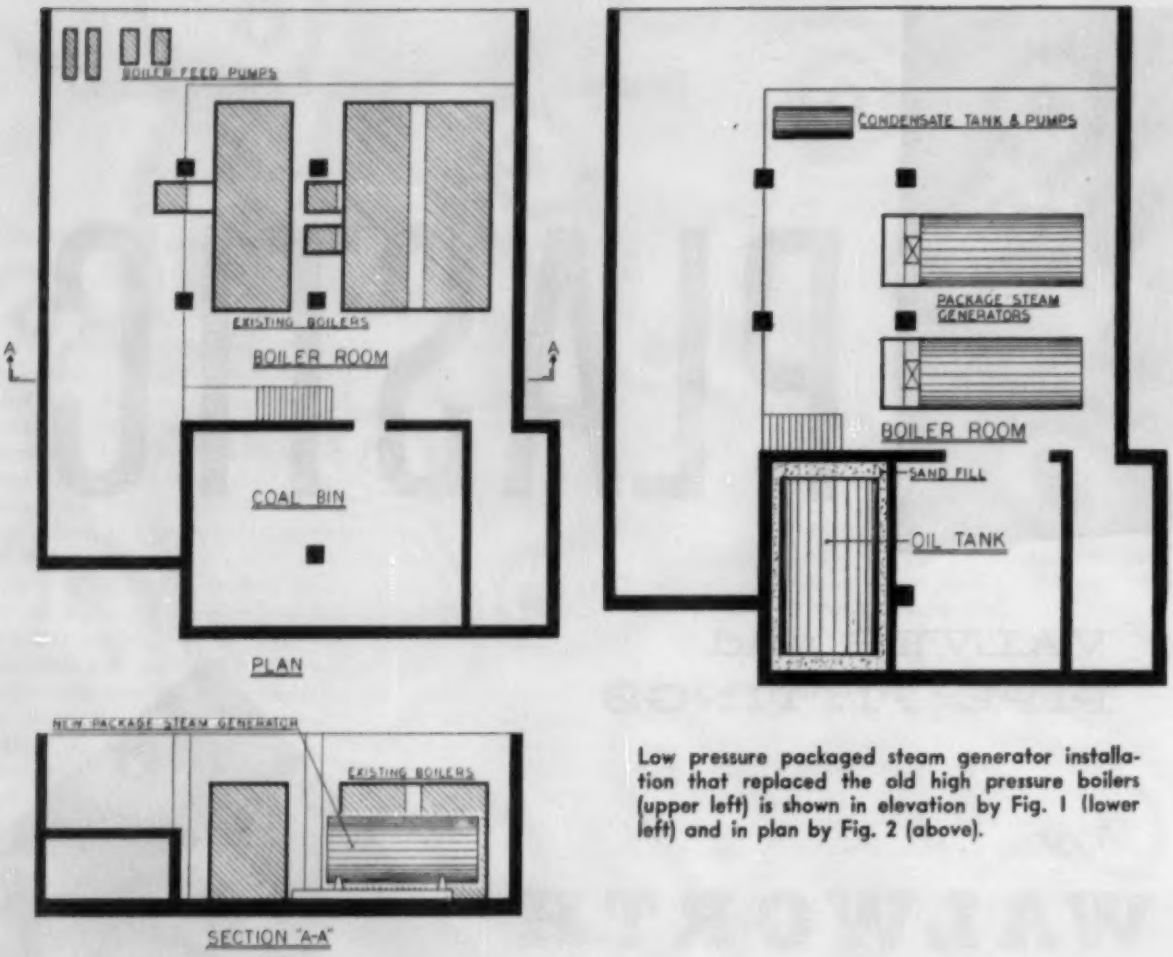


Low pressure packaged steam generator installation that replaced the old high pressure boilers (upper left) is shown in elevation by Fig. 1 (lower left) and in plan by Fig. 2 (above).

How to Specify . .

Packaged Steam Generators

By **DENARD L. GUSLER, P.E.**
Clark, Buhr and Nexsen
Architects and Engineers
Norfolk, Virginia

THIS WRITER was intimately concerned with the operation of a number of HRT (Horizontal Return Tubular) boilers for a number of years. It was observed that this type of boiler would take incredible punishment.

In one installation, a battery of three boilers rated at 150 boiler horsepower each, furnished steam to a steam engine driving a 900 kw generator. The water rate on this engine was about 45 pounds of steam per kwh. A rough calculation will show that the boilers were producing 1200 bhp, a load of 250% of their rated capacity—and yet these boilers were operated for thirty years.

On one occasion the boilers were over-fired to the extent that secondary combustion in the breeching caused it to glow a cherry red and sag dangerously in its supporting cradles. One of the boilers was seriously blistered due to an accumulation of mud in front of the blow-off pipe. (The boiler water make-up was pumped directly from a river which was occasionally quite muddy.) The boiler was patched and operated for nine years.

Accumulations of scale eventually bridged the tubes and when feedwater treatment was first started, the flow of scale stopped up the blow-off pipe daily for several weeks. Yet when these boilers were dismantled and sold for scrap, the metal was surprisingly sound—a worthy tribute to the fact that thirty years ago the boiler design was liberal.

It is quite true that when oper-

ated at higher pressures the HRT boiler is dangerous and a blow-off pipe that comes loose or a ruptured shell is a lethal instrument of destruction. However, with the proper protective devices and when properly operated, the HRT boiler is reliable and dependable equipment.

For the foregoing reasons it has been interesting to see the wide acceptance of the modified scotch-marine, dry back, horizontal boiler now known as the packaged steam generator usually, designed for 15 or 125 psig operating pressure.

A number of companies are now manufacturing this type of boiler and since oil and gas have become more available, ever increasing numbers are being installed in hotels, institutional, and industrial buildings.

Advantages

This type of boiler has some advantages that are readily apparent. Even in the larger capacities it requires little head room and a short stub stack. It comes mounted on a steel chassis and may be skidded into place and installed in a few hours. The only connections required are steam, feedwater, oil or gas, electricity, and drain.

The boiler comes complete with burner, blower, appurtenances, controls, oil or gas auxiliary equipment, fittings and trim, all assembled and adjusted by the factory expert. Thus the entire assembly is the responsibility of one manufacturer or a combination of boiler and burner manufacturer closely allied.

The complete unit can be readily transported to the site by a common carrier and easily unloaded.

Disadvantages

Disadvantages are the fact that the unit is rather long, requires space for tube removal and replacement, and is made of steel which is subject to the detrimental effects of certain elements found in most water. This latter can be corrected by a minimum of feedwater treatment.

Unfortunately the packaged steam generator is thought of as a high pressure boiler and very little consideration is given to the fact that it is also a low pressure boiler. As a low pressure installation it can be operated automatically without the operating personnel usually required by a high pressure installation. Furthermore with the proper auxiliary equipment the low pressure installation can combine many of the features of the high pressure installation and operate just as efficiently.

The owner is not only interested in savings in fuel that can result from efficient operation but particularly in the considerable savings that can be effected in operating personnel. With a packaged steam generator the building mechanic can readily become the boiler operator with only a few minutes daily devoted to routine boiler operation.

The boiler room will remain relatively clean and since the operation is entirely automatic a high degree of efficiency is possible. These results were achieved recently when an antiquated high pressure boiler plant was completely demolished and sold for scrap. The installation was replaced with a low pressure packaged steam generator installation.

Example

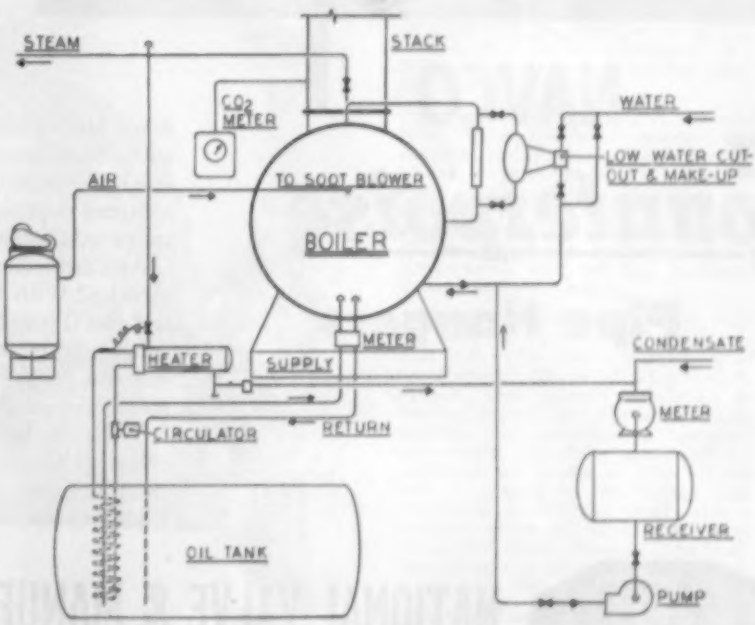
The boiler room and space required for the old installation is shown in Fig. 1. The boilers were a cross-drum, up-right, type operated at 125 psig with reducing stations located above the boilers reducing the steam to 2 psig for heating the building. Coal was manually loaded from the coal bin to a conveyor that emptied into underfeed stoker hoppers.

The boilers were provided with turbine driven forced-draft fans, reciprocating steam driven boiler feed pumps, and no deaerator. A steam actuated, mechanical linkage, system of combustion control was utilized. Steam was metered with an orifice type flow meter.

Three boilers were required for the maximum peak load. The boilers required a full time operating shift. Maintenance on the boilers was good, however the boiler room was smoky and very dirty.

As shown in Fig. 1 there was very little working room around the boilers and the boiler feed pumps were not available from the firing floor. Fuel was measured by

Fig. 3. Mechanical arrangements are the essential elements necessary to provide the operational features usually reserved for high pressure installations.



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the quantity purchased and average efficiency was estimated to be 60 to 65%. Ashes were laboriously removed manually.

The low pressure packaged steam generator installation that replaced the old high pressure boilers is shown in elevation by Fig. 1 and in plan by Fig. 2. The considerable increase in available working space is evident. The mechanical equipment that was provided in conjunction with the packaged steam generators is shown in Fig. 3.

Principal Equipment

The mechanical arrangements shown schematically in Fig. 3 are the essential elements necessary to provide the operational features usually reserved for high pressure installations. The equipment shown and function is as follows:

Combustion Control and Fuel Oil Burner—completely automatic as further described in the specification in the latter part of this article.

Metered Fuel Flow—positive displacement fuel oil meter with intergrator to meter the flow of fuel oil. Provided with the boiler burner.

Metered Steam Flow—positive displacement, gravity fed, condensate return meter with intergrator to measure the condensate returned to the boiler, calibrated to read in pounds per hour. Where condensate is not returned to the boiler additional meters will be required.

Combustion Efficiency—a CO_2 meter with indicator and recorder is provided to show the CO_2 under all load conditions.

Flue Blower—a set of flue blowers is provided and supplied from a suitable air storage tank with a small air compressor. Blowing flues is a manual operation and requires that the operator manually push a few small levers once each 24 hours of operation. This item is not absolutely necessary but will help materially to maintain a clean boiler.

Boiler Feed—a condensate receiver is provided with one or more pumps float actuated to return the condensate to the boiler. If a duplex pump arrangement is provided it is controlled by a duplex alternator. The arrangement is such that either pump can feed either boiler.

Boiler Make-Up—A float actuated boiler water controller automatically supplies water to the boiler as required directly from the domestic water supply system. This device also functions as the boiler water cut-out to stop the burner in the event of low water. It is furnished and piped as a part of the packaged steam generator unit.

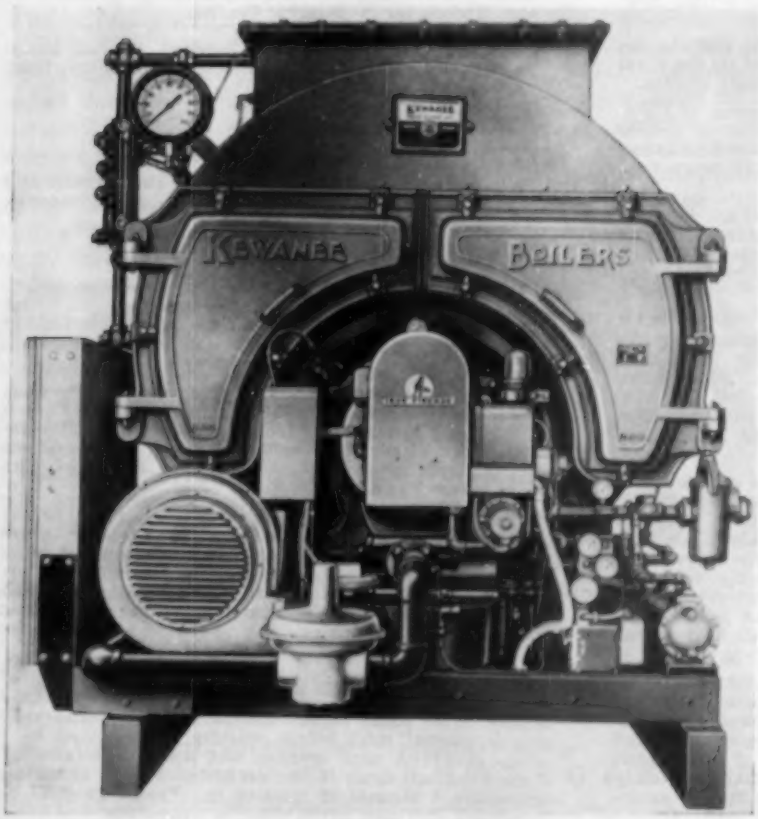
Fuel Oil Tank—the fuel oil storage tank is provided in accordance with the applicable requirements of the National Board of Fire Underwriters. The capacity should be as required for an adequate storage with capacity for unloading a standard tank truck. In this particular installation as shown in Fig. 3, the tank is located in the former coal bin inside a retaining wall with a complete cover of sand to a depth of one foot above the top of the tank. The remaining area in the coal bin is available for other usage.

Fuel Oil Heater—a steam to water

TABLE I—SBI RATINGS FOR MECHANICALLY FIRED COMMERCIAL STEEL BOILERS

SBI Rating			SBI Net Rating			Minimum Furnace Volume	Heating Surface
Sq Ft Steam	Sq Ft Water	Btu	Sq Ft Steam	Sq Ft Water	Btu	Cu Ft	Sq Ft
2190	3500	536,000	1800	2880	432,000	15.7	129
2680	4280	643,000	2200	3520	528,000	19.2	158
3160	5050	758,000	2600	4160	624,000	22.6	186
3650	5840	876,000	3000	4800	720,000	26.1	215
4250	6800	1,020,000	3500	5600	840,000	30.4	250
4860	7770	1,166,000	4000	6400	960,000	34.8	286
5470	8750	1,313,000	4500	7200	1,080,000	39.1	322
6080	9720	1,459,000	5000	8000	1,200,000	43.5	358
7290	11660	1,750,000	6000	9600	1,440,000	52.1	429
8500	13600	2,040,000	7000	11200	1,680,000	60.8	500
10330	16520	2,479,000	8500	13600	2,040,000	73.8	608
12150	19440	2,916,000	10000	16000	2,400,000	86.8	715
15180	24280	3,643,000	12500	20000	3,000,000	108.5	893
18220	29150	4,373,000	15000	24000	3,600,000	130.2	1072
21250	34000	5,100,000	17500	28000	4,200,000	151.8	1250
24290	38860	5,830,000	20000	32000	4,800,000	173.5	1429
30360	48570	7,286,000	25000	40000	6,000,000	216.9	1786
36430	58280	8,743,000	30000	48000	7,200,000	260.3	2143
42500	68000	10,200,000	35000	56000	8,400,000	303.6	2500

Fig. 4. This boiler-burner combination was selected.



convertor is provided with a water circulator connected to a heating coil in the fuel oil tank for the purpose of heating fuel oil of commercial grade No. 6. Steam to the convertor is thermostatically controlled by a control element connected to the circulated water. This arrangement is necessary because low pressure steam will not push the condensate out of the heating coil in the fuel oil tank.

The foregoing mechanical equipment comprise the basic essentials that are necessary when the owner or management is interested in operating results and costs. They should, however, be considered the minimum that might be considered as good installation practice.

Selection

The boiler-burner combination selected by the contractor for the installation described in this article is shown in Fig. 4. The following features should be noted:

▸ 1. The two doors at the front of the boiler are hinged and will swing open for cleaning or maintenance purposes without interference from burner and auxiliary equipment.

▸ 2. Burner, piping, and auxiliary equipment are grouped for ready access for cleaning or maintenance. The burner is hinged so that it may be swung out when necessary.

▸ 3. The combustion control panel is located to one side to provide maximum access to the front of the boiler for cleaning or maintenance without interference and without endangering delicate equipment located in the panel.

▸ 4. All gauges are readily visible.

However, these features are not all that affect the boiler selection. The proper selection should be based on the following factors:

▸ 1. **Radiation Load**—the connected load in Btu per hour as required for installed radiation, unit heaters, unit ventilators, heating coils, etc.

▸ 2. **Hot Water Supply** — the connected load in Btu per hour as required for heating domestic hot water, heating fuel oil, etc.

▸ 3. **Piping Loss**—the heat emission in Btu per hour of piping connected to items 1 and 2 above.

▸ 4. **Warm Up Load**—Btu per hour required for heating up the

SPECIFICATION OF THE LOW PRESSURE PACKAGE STEAM GENERATOR

NOTE: For this illustration the largest boiler shown in Figure 5 will be specified.

BOILER—The boiler shall be a package type, horizontal, firetube, steel boiler with integral burner and all necessary appurtenances, controls, and auxiliary equipment mounted to the maximum practical extent as an integral unit on a steel base, so as to make a completely self-contained, steam generating unit.

The operating pressure shall be 15 psig and the capacity shall be 10,200,000 Btu per hour based on the Steel Boiler Institute Ratings for Commercial Steel Boilers.

The boiler shall have a certified output rating of 150%. The fuel burning rate shall be 140 gph based on 136,000 Btu oil. The certified efficiency at continuous SBI rating shall be not less than 80% with 13½% CO_2 when fired with oil of 18,500 Btu—HHV per pound.

Flue gas temperature at SBI rating shall not be more than 125 degrees over and above the saturated steam temperature at the operating pressure specified. Moisture content shall not exceed 1% with boiler concentration not to exceed 3500 ppm.

Boiler shall be constructed in accordance with the latest revision of the Construction Code for Boilers for the operating pressure specified, and shall bear the ASME standard symbol. Boiler shall be two pass. Flue transition piece shall be capable of carrying the full and total weight of the complete stack. Insulation shall result in a temperature at the surface not to exceed 140 F in an ambient temperature of 100 F.

BOILER TRIM—Each assembly shall be complete and shall include, all necessary fittings, blow-down valves, blow-off piping, feed piping, water column, pressure gauges, feed water level regulator completely piped with by-pass feed stop and check valves, safety valves, and all other boiler appurtenances shall comply with the applicable requirements of the Boiler Construction Code and shall conform to the best standards of power plant practice. A flue gas dial thermometer shall be provided mounted in the flue gas outlet.

BURNER—The burner shall have a capacity of 140 gph, commercial grade No. 6 oil, and shall be horizontal rotary atomizing type with gas electric ignition and full automatic programming devices. Burner and installation shall be in accordance with the National Board of Fire Underwriters Pamphlet No. 31. All equipment shall be readily accessible for cleaning and repair. The following equipment shall be included:

Oil Circulating Pump
Magnetic Oil Valve & Snapswitch
Gas-Electric Ignition Assembly
Strainer Assembly
Check and Relief Valves
Pressure and Vacuum Gauges
Motor and Linkage for Modulating Air-Oil Control
Aux. Switch for Modulating Control
Air Flow Safety Switch
Electronic Combustion Control System
Thermostatically Controlled Electric Heater to Heat Oil to Atomizing Cup
Oil Heater Assembly for Steam
Thermostatic Steam Regulator
Steam Trap
Oil Thermometer
Totally enclosed Combustion Control Panel containing all Necessary Switchgear, Starters, and Protective Devices
Draft Indicator
Oil Meter

CONTROLS—Controls shall include devices necessary for automatic control of steam pressure, combustion, boiler water level, and shall include all necessary interlocking and time relays for proper ignition, sequence of starting, programming, and automatic restart.

Controls shall protect against flame failure, low water, excessive steam pressure and shall require manual reset. All electrical devices shall conform to the National Electrical Code. Combustion control shall be in accordance with the requirements of the National Board of Fire Underwriters Pamphlet No. 31.

STEAM PRESSURE CONTROL—Steam pressure actuated primary element shall be provided to actuate burner and forced draft fan controls through an electrical relay system so as to maintain the steam pressure within the normal prescribed limits at all loads within the rated capacity of the boiler. The controls shall be of the best design required for full modulating control equipment for the boiler as specified.

FLAME FAILURE—Flame failure device shall be of the electronic type and shall shut down burner within 4 seconds after flame failure due to any cause and shall require manual reset before starting. There shall be a safety shutdown with ignition and main fuel valve off if main burner flame is not confirmed by the electronic cell within 7 seconds of ignition on. Pre-purge shall be 30 seconds, and post purge shall be 15 seconds.

cold system. In using the boiler selection method outlined herein item 4 is not considered.

Estimated Load

The net load on the boiler is the radiation load plus the hot water supply load. The design load is the sum of items 1, 2, and 3. For the purposes of this illustration we can assume that items 1 and 2 total 8.4 million Btu and items 1, 2, and 3 total 10,200,000 Btu. The resultant loads are then:

Net load	8,400,000 Btu
Design load	10,200,000 Btu

The boiler should satisfy the design load and should be based on Steel Boiler Institute Ratings for Commercial Steel Boilers as outlined in Table 1 for mechanically fired boilers. This Rating Code was revised Jan. 1, 1948, and applies to commercial boilers defined as those having 129 to 2500 sq ft of heating surface. The boilers are rated on the basis of heating surface with limitations set for furnace volume.

The boiler as supplied by the manufacturer should equal or exceed the standards of this code. With reference to Fig. 5 it will be noted that the largest boiler shown will satisfy the design load assumed for the purposes of this illustration. The code states that a boiler of this capacity (10,200,000 Btu per hour) should have a minimum furnace volume of 303.6 cu ft and a heating surface of 2500 sq ft.

A commercial boiler of this type should operate at a certified 80% efficiency at full load rating. 10,200,000 Btu ÷ .80 equal 12,750,000 Btu. 12,750,000 Btu ÷ 2500 sq ft equal 5100 Btu heat release per sq ft of heating surface. A boiler under normal operation at this heat transfer rate will not give exit flue gas temperatures that are inconsistent with good practice.

The furnace heat release is 12,750,000 Btu ÷ 303.6 cu ft equal 42,000 Btu per cu ft of furnace volume. This value of heat release is consistent with good practice.

It cannot be too strongly emphasized that boilers will give a

(*Continued on page 97*)

Your plant and equipment suffers . . . your community goodwill fades away. These problems can be solved. Prat-Daniel Collectors are designed for the control of industrial dusts and flyash. Multiple small diameter tubes provide powerful centrifugal forces, resulting in sustained high collection efficiency . . . even with ultra-fine dusts.

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Write for Reprint No. 102 titled, "What Type Collector?"

pd

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FIG. 19084—900-Pound Steel Pressure Seal Non-Return Globe Valve, Gear Operated.

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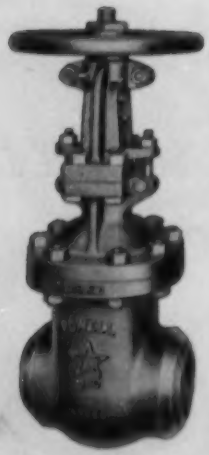
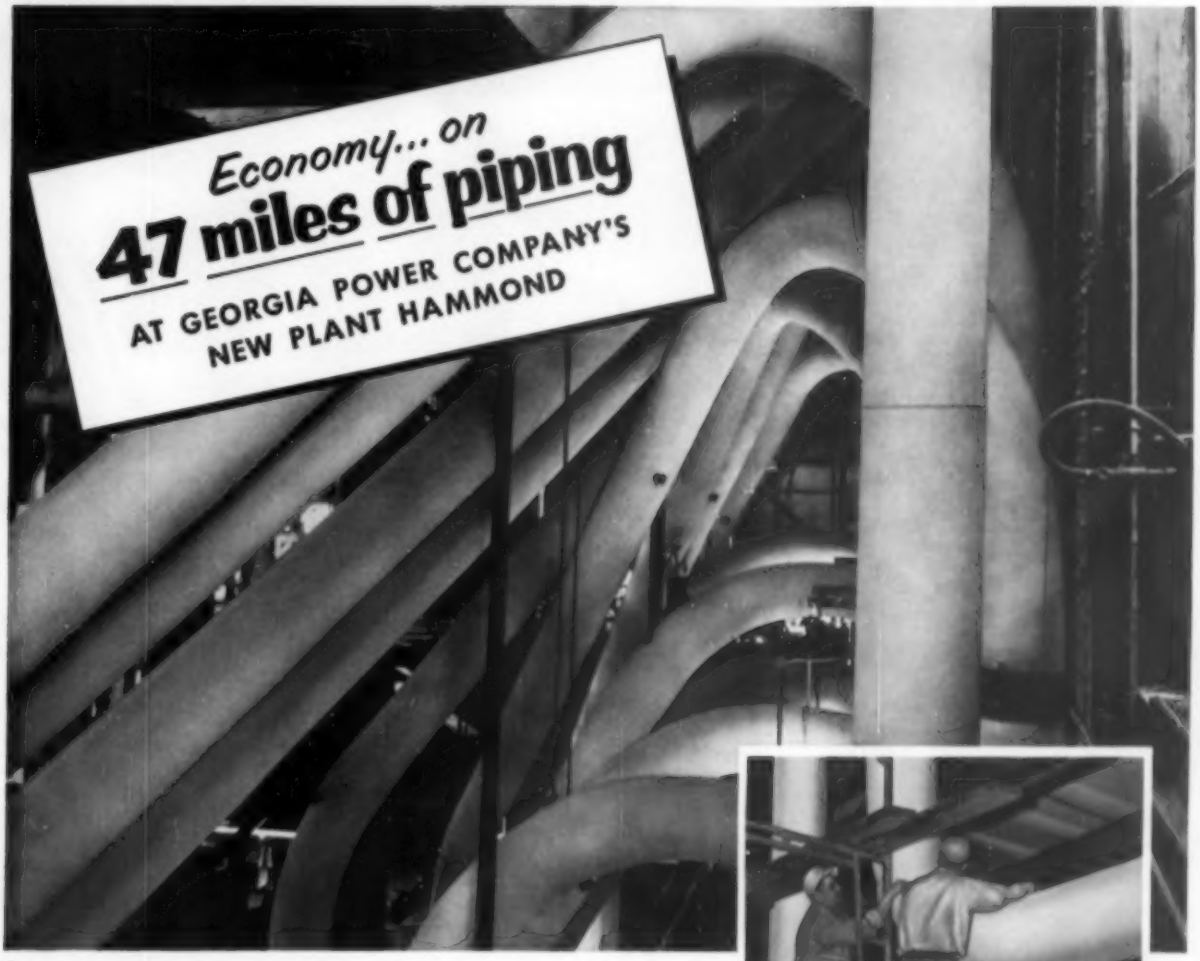


FIG. 1503WE—150-Pound Steel Gate Valve.

FIG. 11323—1500-Pound Motor Operated Steel Pressure Seal Gate Valve.

FIG. 19003—900-Pound Steel Pressure Seal Gate Valve.

POWELL VALVES



47 miles of Johns-Manville 85% Magnesia Insulation boosts operating efficiency of Plant Hammond, one of the South's largest and most modern private utility installations.

Insulating feed water line at Plant Hammond. Contractor for this job was Brooks-Fisher Insulating Company of Atlanta, Georgia.

J-M 85% Magnesia Insulation helps cut fuel rate 25% below national average

Officials of the Georgia Power Company were gratified when the coal rate of their new Plant Hammond worked out at 0.75 lb. per KW HR, 25% below the national average. In their annual *Electrical Industry Statistics, Electrical World* had reported that increased efficiency in the techniques of power production has lowered the average coal rate to 1 lb. per KW HR. in 1954.

An important factor contributing to Plant Hammond's high efficiency was the selection of insulation. Johns-Manville's 85% Magnesia was applied in the most economical thicknesses throughout the plant for all piping and equipment operating in its temperature range. At higher temperatures 85% Magnesia was used in combination with J-M Superex® diatomaceous silica insulation.

This is only one of thousands of case histories where J-M 85% Magnesia has helped industry achieve outstanding fuel savings and increased operating efficiency. In all types of manufacturing and processing plants it is the standard for temperatures to 600F . . . providing high insulating value, easy application, long life, initial low cost and minimum maintenance. Write today for further information on J-M 85% Magnesia and Johns-Manville's complete drawing-board-to-job-site insulation service. Address Johns-Manville, Box 60, New York 16, New York. In Canada, Port Credit, Ontario.

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½ inch through 42 inches . . .

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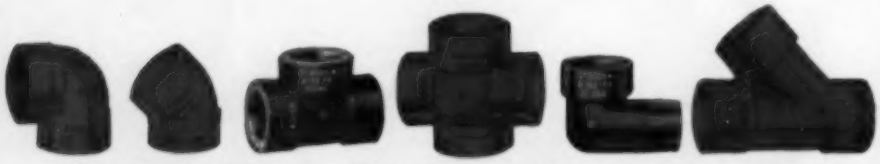

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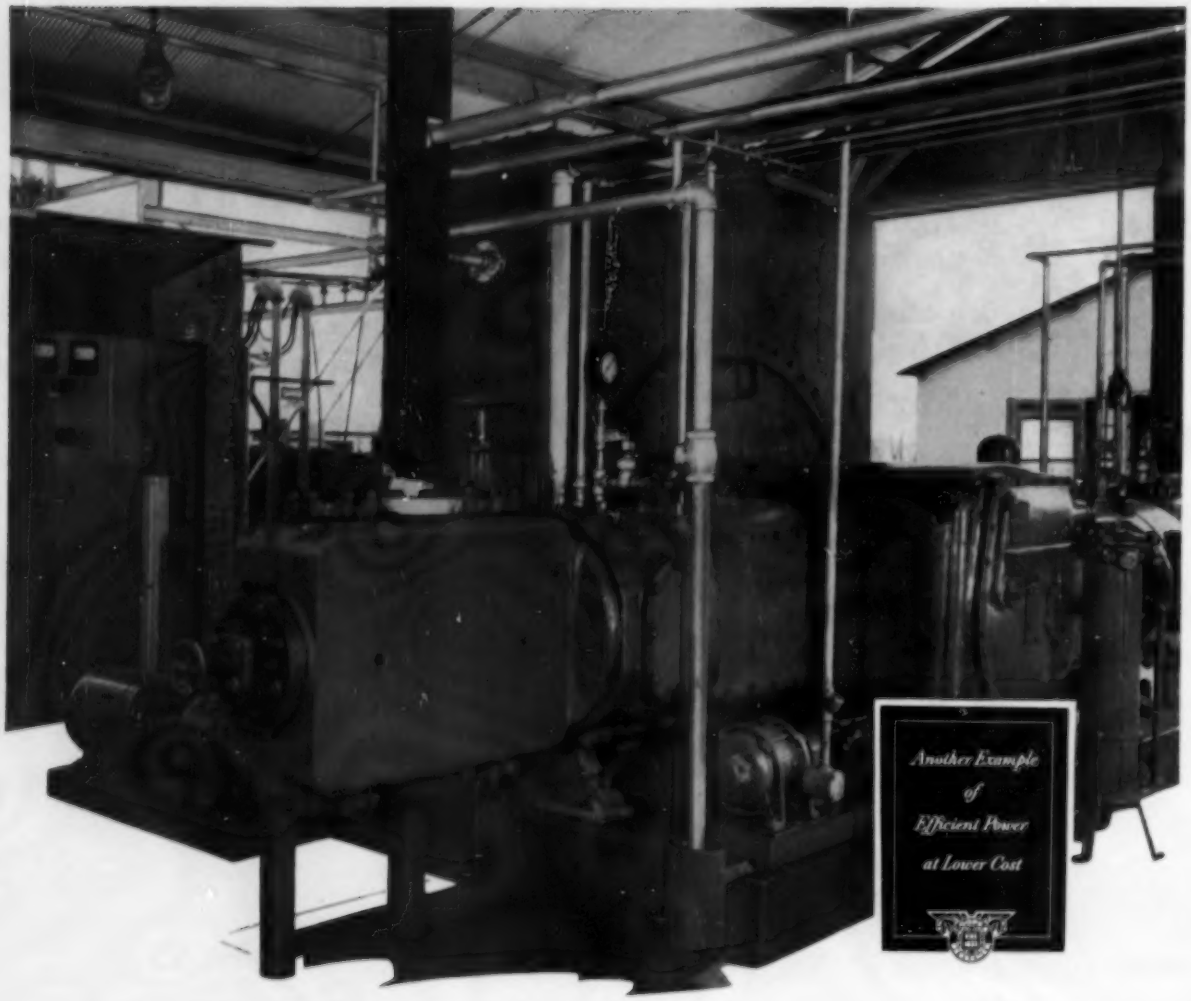

Cooper-Bessemer Compressors operate "on their own"

ACTUALLY, the statement that Cooper-Bessemers are "on their own" is far from an exaggeration. For example, this single stage Cooper-Bessemer FM-2 compressor, installed in a Michigan refinery, runs 24 hours a day without operating personnel.

This money-saving advantage is made possible by highly efficient Cooper-Bessemer controls which automatically handle all phases of the compressing operation.

Moreover, in this plant's processing, contamination by oil is completely avoided. Therefore, the FM unit is equipped with Cooper-Bessemer *carbon pistons*, operating against micro-honed mirror finish liners, requiring no lubricating oil whatever! — a highly important factor in various processes involving compressed air and other gases.

Whatever your compressor requirements may be, from 100 to 5000 hp, Cooper-Bessemer offers you unique advances assuring the highest efficiencies combined with lowest cost operation. Your nearest Cooper-Bessemer office will gladly give you the specific information you may require.

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Ideas . . Methods . . Gadgets

Payroll Calculations Simplified

"THIRTY days hath September" is an easy guide to remember. But it's little help, if you're figuring reams of seniority, vacation or pay records where it's important whether a month has 28, 30, or 31 days.

Personnel specialists at Temco Aircraft Corporation maintain calendar-day records for some 7,000 employees. Until recently, Personnel had to flip through the calendar to find out on what day of the month John Doe's leave of absence would end, or his next automatic wage rise would begin.

Now, a circular computer provides the same information in two-thirds less time than it took to find it on the calendar. The computor, in fact, can project its user to any desired date in the future, or backtrack just as easily to a date in the past. No scratch pad mathematics are required.

The "Calcudator" — as Temco calls the computer—is the invention of three members of the Dallas, Tex., company's Personnel Department—Job Analyst Garland Bearden, Interviewer Joe Russell and Clerk Jean Tunstall.

Calculator Design

They had looked for some time for a quick way to determine two items of information necessary for calendar-day records: the number of days between given dates, and the date after a given number of days.

They developed a somewhat successful formula, based on three model months—one 28 days, another 30, and the third 31, days long. Using this formula was faster than using a calendar, but it involved two subtraction problems. Personnel wanted something better.

They decided a circular computer would be most practical and began looking for a precise method for dividing a circle into 365 equal parts.

Temco's Machine Shop put a jig-borer operator on the job. He centered an 18-in. square sheet of heavy aluminum on his jig-borer table, put a scribing attachment in the spindle, and positioned the turntable's indexing head attachment for proper spacing of indices.

Then, by traversing the table for each mark, the operator scribed 365 evenly-spaced lines in a circular pattern around the aluminum square.

The 9-in. diameter indexed circle was cut out on a punch press and photographed onto metal template stock. Then the reproduction was placed in a lathe for a precise circular cut which sliced a 1¼-in. ring off the edge of the 9-in. circle.

This cut bisects each the 365 scribe marks and allows the outer ring to turn independently. Bisected scribe lines on the outer ring coincide perfectly with those on the dial. Both pieces are mounted on a heavy aluminum base, and the

PAY ROLL calculator was shop designed and made. Will also quickly determine number of days employees spend on leave; when they are eligible for progressive wage increases; how much pro rata vacation a terminating employee is due; and answers to a half-dozen other types of record-keeping questions.

inner dial, mounted on a pin, is turned with a masonite knob. A plexiglass sweep indicator, attached to the same pin, turns independently.

Index marks on the stationary outer ring are numbered, one through 365. Matching marks on the movable inner circle are grouped into months. And 52 indices on another circle—a five-inch-diameter plexiglass dial which moves with the larger inner dial—represent weeks of the year. This also is the basis for a Temco Tabulating Department review code.

Thus, when Jan. 1 on the calendar-day circle is aligned with 1 on the outer ring index circle, every calendar day is precisely aligned with its respective day of the month.

How It Works

Personnel has compiled a book of instructions for applying the Calcudator to all types of record-computing problems.

Under "Vacations," for example, the booklet presents this sample problem and solution:

Where an employee is rehired after layoff, has his seniority connected, was not eligible for pro rata vacation at time of layoff, and there is only one layoff involved, compute his vacation as follows:

a. Set employee's hire date to align with 365 on the outer ring index.
b. Move the indicator to align with date employee was laid off. This determines the number of days credit the employee has earned previously.
c. Allow the indicator to remain at the number determined under "b" above, and then align the date of employee's rehire with the indicator.
d. Employee's vacation eligibility date is that date which aligns with 365.

Personnel also uses the Calcudator to determine quickly the number of days employees spend on leave; when they are eligible for progressive wage increases; how much pro rata vacation a terminating employee is due, and answers to a half-dozen other types of record-keeping questions.

Stainless Overlay Combats Corrosion

IN planning any new paper mill, one of the first obstacles to be considered and overcome is corrosion. Though this problem is common to many industries, it is particularly serious in the manufacture of paper, since it strikes at the plant's heart—the pulping digesters.

The danger of corrosion could be met with a corrosion-resistant material of solid plate, lining, or clad, but this does not always overcome the problem of erosion nor is it always conducive to efficient maintenance and repair.

Recently, when West Virginia Pulp and Paper Company was planning a new mill at Luke, Md., the corrosion problem was approached in a manner relatively new to the pulping industry.

Experience has shown that certain areas in a digester are more vulnerable than others to the corrosive action of the pulping mixture. The location of these areas, however, can be closely predicted. Generally, severe corrosive damage is localized in the top head and bottom cone areas.

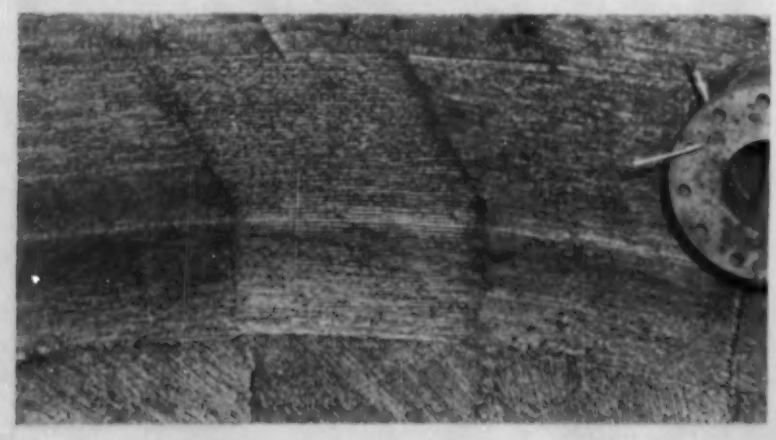
Localized Protection

To prevent this in the Luke Mill's digesters, West Virginia asked Graver Tank and Mfg. Co. to apply its skill in the use of special means of combating selective corrosive attack developed and tested in the laboratories of the Crucible Steel Company of America.

The method consists of the application of a protective covering of stainless steel weld overlay on those areas most vulnerable to corrosive attack.

Requirements at West Virginia's Luke pulp mill called for three digesters, each measuring 11' 3" in diameter and 42' 9" high. To prevent corrosion of these vessels, Graver applied a thin overlay of stainless steel weld metal to a portion of the top shell and head plates in each. Thus, the danger areas in each digester are protected by the equivalent of a solid sheet of stainless steel.

Since this method of localized protection can be utilized equally well on older vessels also, its advantages immediately become evident. With the passing of time, indications of corrosion can be seen and the vulnerable areas quickly protected with weld overlay before serious damage occurs.



Section of the stainless steel coating that was welded on tank plate.

Repair Cost Cut 50%

THE purchase of their first metallizing unit in 1942 quickly opened up an entirely new field of endeavor for Yancey Brothers of Atlanta, Ga. The major work of this company consists of the sale and servicing of Caterpillar tractors, although they now do a considerable number of other mechanical repair jobs as well. It is worth noting that previous to 1942 almost no tractor parts were repaired. In fact they did not even have a crankshaft grinder at that time. Such costly components as brake drums, crankshafts and axles were generally discarded when they became worn.

Applying .80 carbon steel to RD-7 Tractor brake drum.

With the start of World War II, parts and materials became scarce and Yancey Brothers was faced with a big problem: How to keep tractors and other essential machinery running when parts were unavailable or delivery dates stretched into weeks. "Metallizing was the answer," said H. B. Wilson, an assistant foreman in their machine shop. So, for the past 12 years, this amazingly versatile tool has become more and more important in their operations. The unit was furnished by Metallizing Engineering Co., Inc.

Homer Leggett, plant foreman, said, "We found metallizing to be both economical and speedy. It took only one man to operate the unit. Now, he spends about

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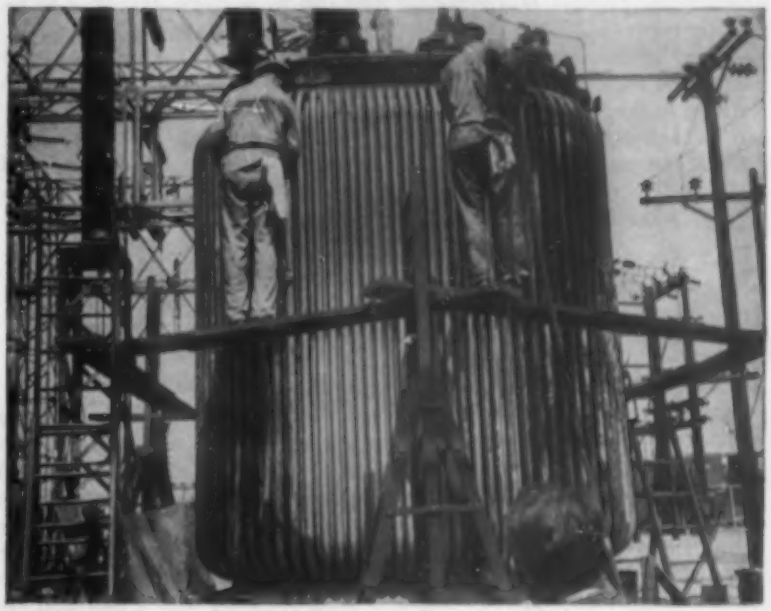
with maximum protection and minimum application



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Subox Inc.

6 Fairmount Plant, Hackensack, N. J.

half of his working hours—or roughly 20 hours a week—doing nothing but metallizing."

Their surface preparation at first was done by grit blasting. When Metco brought out Sprabond, the self bonding metal, this practice was discontinued and the preparation became much faster and cheaper.

A few of the many and varied parts metallized by Yancey Brothers are: brake drums, gears, tractor crankshafts and tractor axles.

This company does not confine metallizing only to their primary tractor interests. They are also happy to be able to extend it as a service available to other adjacent business. An example was the solving of a rather major problem for an Atlanta bakery firm. The bakery's dough-mixing shafts are made of stainless steel. At one time, when these expensive shafts wore down, they had to be discarded and new ones installed. Now they can be built up and reclaimed with the Metco unit—time and time again. This has resulted in a considerable saving to the bakery and another good repair service for Yancey Brothers.

New Performance For Old Water Softener

A ZEOLITE water softener in service at a southern rayon and textile plant was having to be regenerated every seven hours in order to obtain the required gallonage of soft water. The manner in which this water softener was remodeld so that once-a-week regeneration now supplies ample soft water is an interesting example showing how to get new performance from an old water softener.

Modernization

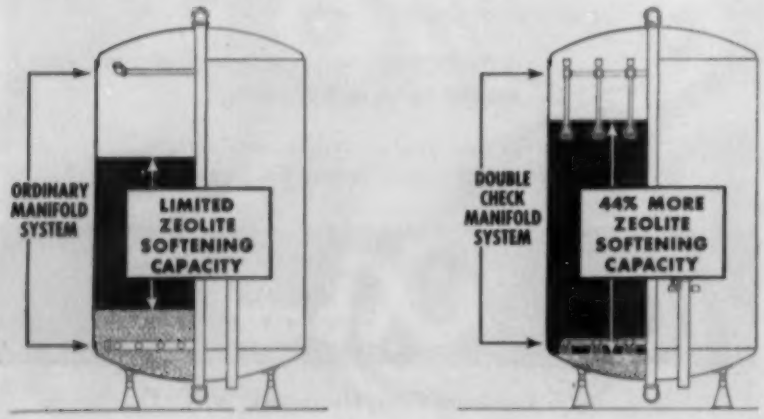
The manifold system of this water softener was replaced with an Elgin Double Check manifold arrangement which permits the use of a far deeper bed of water softening zeolite without costly loss of zeolite. The old zeolite was then replaced with a new and far deeper bed of Rezex zeolite, a high capacity ion-exchange resin.

This deep zeolite bed which is utilized at peak efficiency by virtue of the unusual manifold arrangement enables this old water softener to deliver a full week's quota of soft water before regeneration is necessary. This is in sharp contrast to the every-seven-hour regenerations required prior to modernization of this old water softener. At the same time former costly losses of zeolite are now prevented by the Double Check manifold which employs unique check valves to lock the zeolite inside the water softener.

To simplify operation of this water softener its manual valve nest was replaced with an Elgin Multiport valve. With this valve, the complete operating cycle of the softener is quickly performed with a minimum of attention by one simple rotation of the valve handle.

The modernization of this water softener was a relatively simple matter and was accomplished at relatively low cost compared with the cost of new or additional equipment which otherwise would have been required.

Drawing at left illustrates shallow zeolite bed permitted with ordinary water softener manifold system. Illustrated at right is same softener equipped with "Double Check" manifold system which permits the use of a far deeper bed of zeolite for greatly increased soft water output.


ORDINARY MANIFOLD SYSTEM
LIMITED ZEOLITE SOFTENING CAPACITY
DOUBLE CHECK MANIFOLD SYSTEM
44% MORE ZEOLITE SOFTENING CAPACITY

Lining Prevents Bridging

A RECENT difficult material handling problem was solved by lining a hopper with teflon coated fiber-glass. Wet goods discharging from a centrifuge had a tendency to cling to the sides of a hopper and eventually bridge over a conveyor screw feeding a rotary dryer. Vibration alone did not solve the problem.

A lining of teflon coated fiberglass (.010" thick) was cemented to the hopper and a portion of the screw conveyor body using a special teflon adhesive. The teflon coating presents a smooth, slippery surface to which relatively little material clings. A second application has also been successfully used on a similar equipment set-up to combat a corrosion problem.

By L. J. STOHLDRIER, Maintenance Supervisor, Monsanto Chemical Company, J. F. Queeny Plant, St. Louis, Mo.

Voltage Regulators Aid Manufacturing

BETTER testing and fewer manufacturing rejections at an Alabama electronic tube manufacturing plant have resulted from the addition of Inductrols (G-E dry-type, induction voltage regulators) to the circuits that supply the test area.

The regulators keep the heater supply voltage constant on the test racks. The tubes are, therefore, tested under identical voltage conditions. Defective tubes are quickly discovered. Also, the rejection of good tubes due to poor performance under poor voltage conditions is eliminated.

Plastic Sewer Pipe

EXCESSIVE underground sewer maintenance has become a problem where corrosive wastes are encountered in the operation of a chemical plant.

An investigation into improved methods and materials revealed that furan resin pipe exhibited no signs of failure in an environment which completely disintegrated vitrified clay sewer pipe in less than two years. Several installations of fiber-glass reinforced furan resin sewer pipe have been made. The material is both acid and alkali resistant and exhibits excellent resistance to thermal and physical shock. Wrapped, flanged, or Bell and Spigot joints may be used.

By R. E. HIGH, Maintenance Supervisor, Monsanto Chemical Company, J. F. Queeny Plant, St. Louis, Mo.

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See Pages 16-19

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Equipment . . Supplies . . Methods

FOR FREE INFORMATION—Circle code number on pages 16 & 17

HOW PANES ARE INSTALLED—Resolite flat pane dimensions should always be 1/8" less than standard glass size for same window. This allows for thermal expansion and provides space for proper installation of glazing clips.

If broken glass is being replaced (LEFT PHOTO) make sure all old glazing compound or putty is removed as well as old glazing clips. Slip Resolite flat pane into place (CENTER). Use standard weight for regular window sizes; extra heavy for larger glazed areas.

Then slip short leg of glazing clip into hole in metal sash. Next (RIGHT PHOTO) spring long leg into position between edge of pane and muntin bar so that tension is put on pane from two directions. Use two clips on each side of pane. If there are no holes in muntin bars, they should be punched to receive clips.

Final operation is to fill in edges with glazing compound, smooth off excess, and paint.

For more data circle item code number on the postage free post card — p. 17

Translucent Shatterproof Panels End Pane Replacement

L-1 RESOLITE CORP., Box 531, Zelenople, Pa., is marketing translucent "Resolite" panes made of fiberglass-reinforced polyester resins. Panes are shatterproof and are unaffected by weather extremes or usual industrial fumes.

Panes are ideal for glazing factory windows where pane breakage is high because of severe vibration, flying objects or intermittent radiant heat. Material represents less than 20% of the cost of glazing. Since shatterproof Resolite panes end breakage and expensive pane replacement, they are actually cheaper maintenance-wise than ordinary glazing material.

Resolite transmits almost as much light as clear glass. Tiny glass fibers deflect light rays and spread a uniform, glare-free, tinted light over an entire area.

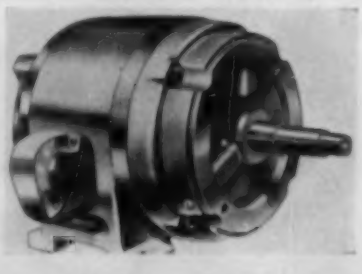
Panes are as easy to install as ordinary glass. However, since this material is more flexible and has different characteristics of expansion and contraction, the use of special glazing clips and compound gives superior results.

Company also announces that Fire-Snuf panes, made of the first and only fiberglass-reinforced polyester material listed and labeled by Underwriters' Laboratories Inc., are available for use where codes call for a flame spread rating below 75 or where fire hazard is severe.

Compact Horizontal Close-Coupled Pump Motor

L-2 U. S. ELECTRIC MOTORS, INC., Box 2058, Terminal Annex, Los Angeles, Calif., is marketing a new motor, with a face type registered bracket and special shaft, suitable for close-coupled centrifugal pump applications.

Built to the new rerated NEMA specifications, the Uniclosed motor is extra compact, with more horsepower in less space. Pump may be mounted flush with motor by bolting to face bracket. This method of coupling in-



sures accurate alignment of pump and motor. To prevent water from entering motor, a solid flange and brass slinger are incorporated. Shaft is stepped with special diameters, and has shoulder and tapped hole for mounting the impeller. The new motors are available in ratings from 1 to 30 hp.

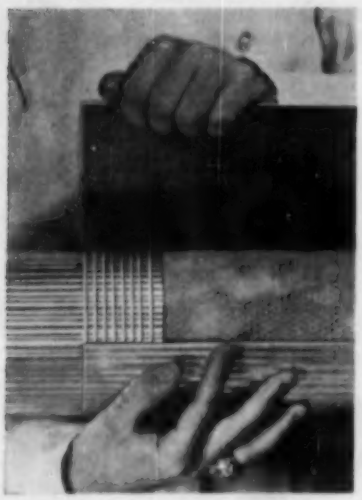
The new U. S. Uniclosed close-coupled pump motor has the latest advancements in motor design as well as many exclusive U. S. features. For additional protection against water entering the motor, Ventrifoil deflectors direct air and deflect water. The castings are normalized for permanent accuracy. Windings are asbestos-protected. Split-type conduit box can be rotated in 90° steps and

located on either side of the motor. Ball bearings incorporate the Lubriflush system of lubrication which assures complete removal of old grease. Rotors are electronically balanced and solid cast.

Positive Weather Seal For Aluminum Jacketing

L-3 CHILDERS MANUFACTURING Co., Box 7447, Houston 8, Texas, has announced "Lap-Seal"—a development which affords a more positive weather seal in outdoor aluminum jacketing insulation.

Lap-Seal is a series of eight ribs rolled into the underlapping edge of Childers jacketing. Lap-Seal permits a more positive weather seal, and also saves labor, since the two-inch ribbed edge eliminates measuring for circumferential lap.



Childers aluminum jacketing is used by America's largest processing plants, power plants and refineries. A few of the advantages of this improved method of weatherproofing outdoor insulation are:

1. Easier to handle—Light weight, yet strong; forms easily to contour of lines.

2. Easier to install—No special equipment necessary, all done right on the job.

3. Easier to attach—Choice of two time saving methods: strapping or screws.

4. Install it and forget it—Never needs painting, will not rot, dry out or rust away.

5. 100% recovery—Easily removed and reused when lines are moved or inspected.

Fairbanks 5 Cost-Cutters For Your Light, Bulky Materials Handling Jobs

rugged construction and smoother operation take the load off your mind . . .

9215-S General Purpose Truck — more widely regarded as a necessary tool in shipping rooms, stores, warehouses, passenger baggage terminals and with transfer and express companies — for use on delivery trucks—where it is unsurpassed for handling small lot merchandise including round objects. Steel framed construction.

A-1448 Utility Truck — very popular in stores, offices, institutions, shipping rooms and factories for carrying small lot merchandise and widely used in bottling and beverage plants and on beverage delivery trucks for moving case lots. All steel welded construction, fitted with stair climber.

Lift Jack Platform Trucks — perfect answers for minimum cost temporary storage of raw material, parts, semi-finished goods or finished pieces. Jack handle has no moving parts — engages and disengages semi-live skid simply and quickly. One jack handle sufficient for a number of platforms.

"Bantamweight" Platform Trucks — outstanding values for lightweight materials handling from low initial cost through minimum operating expense. Readily adaptable to continuous conveyor systems. Light and strong construction, very mobile on Fairbanks "Lockweld" Double Ball Race Swivel Casters and matching rigid casters.

T-1114 Dollies — providing greatest maneuverability for bulky merchandise on Fairbanks "Lockweld" Steel **Double Ball Race** Swivel Casters. Very popular trucks with furniture movers, storage warehousemen and truckers.

YOURS ON REQUEST: Fairbanks Truck Catalog, complete with illustrations and specifications describing Fairbanks Trucks.

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new equipment (continued)

For more data circle item code number on the postage free post card — p. 17

Warning Safety Device for Process Industries

L-4 TEXSTEAM CORPORATION, 320 Hughes St., Houston, Texas, has developed a warning safety device for the oil refining and chemical processing industries.

It is the Texsteam Hydrogen Probe —a device which gives a warning indication on a pressure gauge that dangerous hydrogen blisters are corroding the walls of metal tanks in which chemical reaction is in process under pressure.

The probe is made of seamless carbon steel tubing. One end is closed and machined to make a thinner walled section called the corrosive-sensing-area. This end is inserted into the chemical processing tank, the other end extending outside the tank is held into position with fittings and pressure tight packing.

If inside the tank there is the right combination of hydrogen-ions, sulfides, temperature and/or acidic compounds that can penetrate steel and form hydrogen blisters, these blisters will be formed inside the thinner walled section of the Texsteam Hydrogen Probe before excessive damage is done to the wall of the tank. The hydrogen from the blister will show its presence on the pressure gauge on the probe outside the tank. The operator can then take whatever protective action is necessary to retard this action.

Probes are designed so that they may be removed and inspected or replaced from pressure processing tanks without taking the tank out of production or off the stream. This is done by loosening the packing lock fitting around the Hydrogen Probe, then pulling the probe part way out so that the corrosive-sensing-end is between

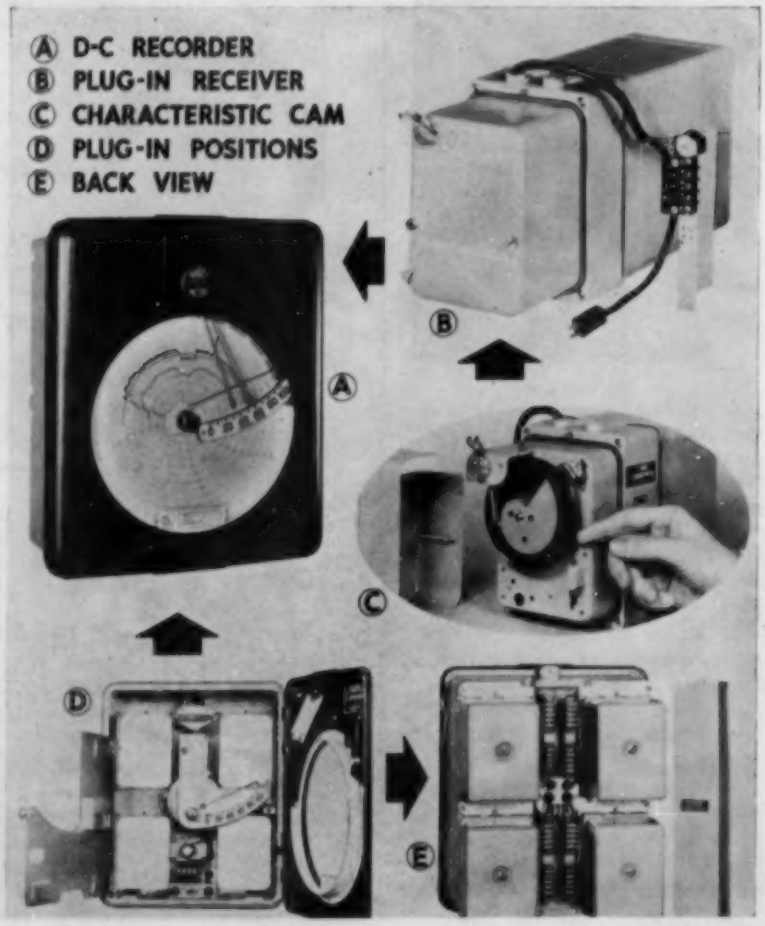
Receiver Recorder Obsoletes Specially Graduated Charts

L-5 BAILEY METER COMPANY, 1050 Ivanhoe Rd., Cleveland 10, Ohio, has developed a new Electronic Receiver Recorder now available for d-c type pickups and d-c telemetering systems used in power plants, process plants, and laboratories.

The recorder may house as many as four plug-in, d-c receivers, or two receivers and two pneumatic controllers. Non-linearity inherent in many pickups is extracted by a characteristic cam in the receiver. Thus, it is now possible to combine four records from d-c pickups, a-c pickups, or pneumatic transmitters on the same uniformly-graduated, circular chart.

This not only eliminates the expense of individual recorders and special charts, it also conserves expensive panel space, provides equal reading accuracy at any point on the chart, and improves record analysis.

The d-c receiver operates on the potentiometric null-balance principle, using an electronic voltage reference in place of the conventional standard cell and battery. Frequent periodic interruption of measurements or control for standardizing purposes is eliminated. The receiver is a single, protected package, equipped with unitized, interchangeable component sections.



the gate valve and the packing. The gate valve is then closed, the pressure bled off and the probe removed. To replace, this procedure is reversed.

Texsteam Hydrogen Probes are made 18", 24" or 36" long for different size processing tanks and are available in three different types of mountings—flanged, threaded or pressure lubricated.

Chain Hoists

L-6 COFFING HOIST DIV., Duff-Norton Co., Danville, Ill., has introduced two light but powerful coil chain ratchet lever hoists—models L-1-½ (capacity: 1½ tons) and LD-3 (capacity: 3 tons), which join Coffing's Super Power Coil Chain Ratchet Lever Hoist line along with 2½ ton and 5-ton models.

Reduction in the hoists is achieved through specially-designed, patented compound levers instead of gears. This feature offers users these advantages:

1. More efficiency. The Super Power hoist, with 85% efficiency, takes only 60½ lb of handle pull to lift a 1½ ton load and only 74 lb to lift 5 tons.

2. More compact. To achieve similar reduction with a series of gears would require a hoist housing much larger and heavier than the Super Power's.

3. Lighter weight. As a result of its smaller size, the Super Power is also the lightest weight ratchet lever hoist in its capacity on the market. The 5-ton model weighs only 56 lb, and is the only hoist in its capacity using only two chains.

4. Higher safety factor. The compound leverage action of the Super Power reduces the number of gears and chains necessary to lift a load. Since there are fewer parts, they are larger in size and stronger enough to provide a safety factor of five in load-holding parts.

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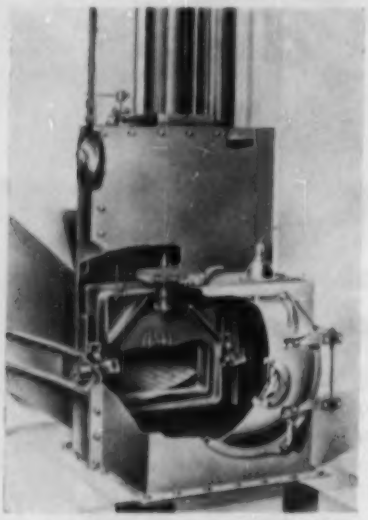
new equipment (continued)

For more data circle item code number on the postage free post card — P. 17

Ash Gate & Feed Housing Unit for Flooded-Type Hoppers

L-7 THE ALLEN-SHERMAN-HOFF Co., 259 E. Lancaster Ave., Wynnewood, Pa., announces the availability of its new ash gate and feed housing unit for installation on flooded-type bottom ash hoppers.

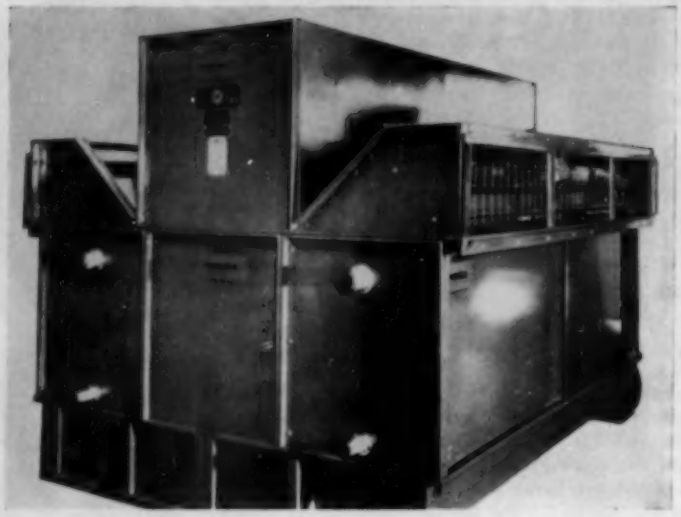
Combining a simple and effective method of providing a tight seal to hold a head of water in the ash hopper and a convenient means of regulating flow of ash and water, this A-S-H unit insures complete watertightness and accurate flow control. In addition, an outside indicator keeps operator informed of the amount of gate opening.



The hydraulically operated, vertical lift type gate is available with either 2 or 3 ft wide openings. A wedging device, which holds the door tight in the closed position to maintain a head of water in ash storage hopper, operates in this manner: Two lugs cast integral on the door engage wedging-cams during the downward (closing) stroke of the door. These engaged cams rotate on stationary shafts to thrust door against the frame.

Each cam is counterweighted to swing free of door lugs when door is raised, while a stop limits movement of cam and positions it for next downward movement of door. Cam setting can be easily adjusted by turning shaft with wrench from outside.

Hydraulic cylinders for operating the gate are available for fresh water or oil operation. Parts can also be supplied for clean salt water operation.



Cooling Equipment Affords Water Saving

L-8 NIAGARA BLOWER COMPANY, 405 Lexington Ave., New York 17, N. Y., has introduced new apparatus providing water saving in industrial cooling and giving close control of temperatures (within 2 F).

The new machine is named the Panel Casing Aero Heat Exchanger. It cools by evaporation and obtains the temperature control by modulating the use of outdoor air.

The fluid to be cooled flows through two parallel-mounted coil sections both of which are continuously kept drenched with a water spray. A portion of this water evaporates while the balance is recirculated by a pump. Air enters through dampered intakes above the coils, travels downward through the sprays and then enters a central plenum between the two sections, at which point the entrained moisture is eliminated. The air then moves upward and a propeller fan ejects it into the atmosphere.

The fluid in the cooling coils is effectively cooled to a point close to the atmospheric wet bulb temperature. About 1000 Btu are transferred, through the wet coil surface to the air stream, for every pound of water evaporated. The action of the air recirculation system holds the temperature constant. Cooling capacity varies directly with the heat input load. The gradual action of the dampers, admitting more air when more cooling is called for, controls the evaporation of the water spray and holds the desired temperature without "hunting" action. If heat is required instead of cooling it is provided either with steam or electricity by a heater in the spray water tank. Much expense is saved because the equipment is designed to be completely assembled on the installation site.

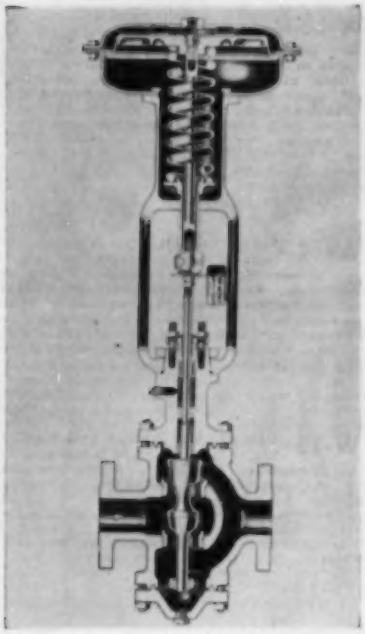
The Niagara Aero Heat Exchanger may be installed anywhere; the usual location is outdoors, on the ground or on a roof. In this model there are four sizes affording capacities from 7,000,000 to 18,000,000 Btu/hr under standard conditions.

There are many industrial applications for this cooling equipment: In the metalworking industries it is used with water, oil or brine quench baths, in cooling furnace doors; in cooling lubricating and cutting oils, wire drawing compounds, hydraulic press oils, plating, welding, rolls and presses. It is used for cooling engine jacket water, degreasers, compressors, transformers, rectifiers, electronic sets, motor generators. In the process industries it is used in cooling chemical reactions, evaporating, distilling, condensing. It is also adapted to cooling compressed air and gases.

Diaphragm Motor Valve

L-9 FISHER GOVERNOR COMPANY, Marshalltown, Iowa, announces its new improved diaphragm motor valves which are available in direct acting (Series 657) or reverse acting (Series 667) construction.

The new units have a bolted-clamp type stem connection which allows stem adjustment of 50% of total travel in either direction. It will not shake loose from vibration or rotational inner valve forces, and it can



be disconnected in the field without damage to the stem.

Diaphragm casings are of drawn steel. Specially designed Buna N molded diaphragms with Nylon insert retain superior flexibility at low ambient operating temperatures. It provides linearity of relationship between instrument signal and travel, and provides maximum effective area.

The stuffing box is the bolted clamp type with Teflon packing. The stainless steel travel indicator is calibrated in percent of valve travel.

Coil Tester

L-10 THE MARTINDALE ELECTRIC CO., 1334 Hird Avenue, Cleveland 7, Ohio, has developed a new instrument designed for testing field coils, armature coils, transformer coils, solenoids, etc. It detects shorts on one or more turns, detects opens, and shows number of turns in a coil from 10 to over 3000.

Minimum coil opening 2⅝" x 3" or 3⅛" diameter. Maximum coil height 6". Operates on 115 volt 60 cycle A.C. current. Transformer base size 12" x 24".

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W-1 FLEX RING CLOSURE—Bulletin 3000—Describes the Sillers "Flex Ring Closure" for faster access to the inside of pressure vessels or piping. Design features one bolt opening and closing, tighter seal at high pressures, and no seal destruction in case of fire. Applicable to boilers, evaporators, heat exchangers, filters, strainers, other pressure vessels and piping systems.—SILLERS ENGINEERING COMPANY, Box 13165, Dallas, Texas.

W-2 NON-LUBRICATED PLUG VALVE—Catalog No. 54-1-W — Describes how company's non-lubricated steel plug valve lifts, turns and reseats in one operation. Wrench-operated, handwheel-operated, and worm gear-operated designs available. Adaptable for remote control through use of electric, air-motor, or air-cylinder operator.—WEDGEPLUG VALVE COMPANY, INC., New Orleans 25, La.

W-3 HEAVY PROCESSING EQUIPMENT — Bulletin "Facilities and Products" — Describes special production techniques at Newport News for the fabrication of any type of pressure vessel and other heavy process equipment.—NEWPORT NEWS SHIPBUILDING AND DRY DOCK COMPANY, Newport News, Va.

W-4 THREAD COMPOUND — Brochure, "The Inside Dope on Big 'D' Dope"—Describes the 90% metallic lead all-purpose thread compound with silicones added. The compound is universally adaptable to water, oil, and chemical lines.—C. H. DRAGERT COMPANY, Inc., Box 5092-7, Dallas, Texas.

W-5 METAL FABRICATING — General Metals Products Catalog—Describes mild steel, stainless steel, clad steel, aluminum and wrought iron fabricating facilities of the Boardman Company. The company fabricates pressure vessels, bins, conveyors, elevators, mixers, smokestacks, tanks, etc. —THE BOARDMAN CO., Box 1162, Oklahoma City, Oklahoma.

W-6 WATER TREATMENT — Booklet, 36 pages—Deals with all phases of coagulation. Describes "Ferri-Floc," and efficient coagulant of surface or well waters. Effective in lime soda-ash softening. Adaptable to treatment of all industrial waters. —TENNESSEE CORPORATION, 617-629 Bldg., Atlanta, Ga.

W-7 POWER TRANSMISSION SERVICE — Catalog GC101 — Describes company's complete line of drives, couplings, and pulleys, which utilize one simplified bushing system, making them more efficient, easier to install and to maintain—BROWNING MANUFACTURING COMPANY, Maysville, Kentucky.

W-8 WATCHMANS CLOCK—Catalog—Describes how the Lathem 72-hour dial watchman's clock gives three full days of recording of watchman's rounds, eliminating dial changes over week-ends. Records up to 40 stations. — LATHEM WATCHMANS CLOCK CO., 72 Third St., N.W., Atlanta, Ga.

W-9 STEEL BUILDINGS—Catalog No. 200—Shows how Allied steel buildings are constructed of standard sections ideal for any building need. The buildings are custom-built from inexpensive standard sections and can be furnished insulated or with asbestos-covered roofs. — ALLIED STEEL PRODUCTS CORP., 2100 N. Lewis, Tulsa, Oklahoma.

W-10 TANKS—Catalog, 50 pages—Covers company's complete line of agitator, reservoir, rectangular, half-round, sphere, steel storage, cone bottom and standpipe tanks. The catalog is extensively illustrated describing wood and steel tanks for nearly every application.—W. E. CALDWELL CO., Brook Street at Brandeis, Louisville 8, Kentucky.

W-11 TRANSFORMERS — Brochure, 8 pages—Describes complete line of distribution and power transformers in sizes from 3 kva to 15,000 kva, and up to 115 kv primary class. Eighteen features of distribution transformer design are outlined and data on coil and core assembly is presented. Detailed mechanical data tables are included—CENTRAL TRANSFORMER CORPORTATION, P. O. Box 687, Pine Bluff, Arkansas.

W-12 COOLING WITH AIR—Brochure, 12 pages — Explains "Solo-aire" and "Combin-aire" methods of eliminating or minimizing water problems by dissipating heat direct to air. Typical problems and solutions are given. Photographs illustrate applications in a wide variety of services directly using ambient air for cooling, and the "one package" integrated cooling system using combination of maximum air and minimum water.—HUDSON ENGINEERING CORPORATION, Fairview Station, Houston, Texas.

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W-13 STEEL BUILDINGS — Catalog No. 2, 26 pages — Photographs show Star steel buildings in use by specific plants in various industries including warehouses, gins and mill buildings, factories, and many others. Construction details are explained; and building components, estimating data sheet, sample floor plan, and engineering service are covered.—STAR MANUFACTURING COMPANY, 2012 South Stiles, Oklahoma City, Okla.

W-14 PIPE COVERING — Bulletin, 6 pages—"Walex" corrosion resistant permanent aluminum pipe covering is described. Photographs show four steps necessary for simple application. Gives specifications and tells how insulation is protected and labor costs are cut.—WALEX METAL PRODUCTS COMPANY, 1202 West 14th St., Houston 8, Texas.

W-15 CHEMICAL CLEANING—Bulletin, 4 pages—Offers a solution to the problem of deposits in piping systems by the company's chemical line cleaning service. Line drawings show use of chemical method, pipe line pig, and jet moles. Photographs and case histories are included.—DOWELL INCORPORATED, P. O. Box 536, Tulsa 1, Okla.

W-16 CASTINGS—Catalog, 28 pages—Partial list of company's foundry products and equipment, together with engineering data and tables for ready reference. Describes large capacity foundry facilities, with high precision and extra large capacity machine tools for heavy industrial and marine work as well as sugar machinery. Photographs illustrate equipment, and plant applications.—SERVICE FOUNDRY, 416 Erato St., New Orleans 13, La.

W-17 PLASTIC SHAPES — Loose-leaf Catalog, 24 pages — Engineering data, ordering specifications, and price lists for sheets, rods, tubes, tapes, packing sets, bellows, spiral back-up rings, o-rings, envelope gaskets, filled teflon, vees, and special shapes available in DuPont's Teflon, Kellogg's Kel-F, and Hi-Quality Nylon, are given, with photographs and line drawings for illustration.—JOHN L. DORE CO., P. O. Box 7772, Houston 7, Texas.

W-18 ELECTRICAL EQUIPMENT — Pictorial Index, 16 pages—Shows a number of the principal items of electrical equipment, including explosion-proof air circuit breakers and magnetic motor starters; explosion-proof lighting panels, control stations, junction boxes and special equipment; water-tight and dust-tight cast iron junction boxes; high voltage motor starters with current-limiting fuses, etc.—NELSON ELECTRIC MANUFACTURING CO., 217 N. Detroit St., Tulsa, Okla.

W-19 PIPE CONNECTION—Catalog 55, 12 pages—General description of new "Gralco" pipe connection featuring "one specification" for all piping applications and pressure ratings; includes construction, operation, advantages, specifications, dimensions, and price list. Illustrated with photographs and line drawings.—GRAY TOOL COMPANY, P. O. Box 2291, Houston, Texas.

W-20 ASA CLASS VALVES — Catalog 55-B, 20 pages—Lists ASA Class full round opening valves and venturi opening valves, for fluids and gases. Gives general material specifications, descriptive information, freight allowances, applications, and includes plastic packing and alloy steel cap screws. Equipment is illustrated.

Maximum temperature rating of plastic packing is 250 F.—ORBIT VALVE COMPANY, P. O. Box 699, Tulsa, Okla.

W-21 **WATER TUBE BOILERS**—Booklet—Describes details of stoker—oil or gas or combination gas/oil, 10 to 350 hp to 250 psi; designed for easy conversion to any fuel.—QUEEN CITY ENGINEERING COMPANY, INC., P. O. Box 2102, Charlotte, N. C.

W-22 **GAS BURNER** — Bulletin — Describes the Rectilinear gas burner, an application of the venturi principle which provides high input through narrow rectangular openings for firing—in a horizontal plane through fire doors or small openings over handfired coal grates or stokers—or for firing in a vertical plane on either side of stoker or oil burner.—THE WEBSTER ENGINEERING COMPANY, 419 West 2nd St., Tulsa, Okla.

W-23 **TANKS OF STEEL AND ALLOYS** — Catalog 102-P&BS — All types of tanks for hot water storage, bulk liquid storage, oil or chemical storage, and other unfired pressure vessel use are illustrated and described.—J. J. FINNIGAN CO., INC., 455 Means St., NW, Atlanta, Ga.

W-24 **ALUMINUM PIPE JACKETING** — Folder J-25 — Gives complete applications and instructions for the use of Childers jacketing for weather-proofing of insulated lines, towers, vessels and tanks. Illustrated with detail drawings.—CHILDERS MFG. CO., 625 Yale St., Houston 7, Texas.

W-25 **MAINTENANCE IDEAS**—"Genius at Work"—Contains ideas about plant maintenance, bits of philosophy, new products and a description of the company's line.—KANO LABORATORIES, 1047 S. Thompson Lane, Nashville 11, Tenn.

W-26 **METAL STAMPING FACILITIES** — Brochure No. 100 — Describes shearing, blanking, drawing, forming, embossing, assembly and finishing equipment in Campco's Carolina plant which offers Southern industry convenient, modern facilities for metal stamping. Covers 67 major units of equipment, including 200 ton hydraulic press to produce finished metal products, from design through delivery.—CAROLINA METAL PRODUCTS, INC., P. O. Box 2626, Charlotte, N. C.

W-27 **OIL AND GASOLINE CONTAINERS**—Catalog No. 55—Illustrates and describes entire line of oilers, safety cans, and oil and gasoline containers available for industrial plants and other users.—EAGLE MANUFACTURING CO., Dept. 55, 2552 Charles St., Wellsburg, W. Va.

W-28 **V-DRIVE SELECTIONS** — Engineering Guide No. 55-B—Tells how to make V-drive selections quickly and accurately, using new horsepower rating and improved rating techniques. Simplified formulas for standard quarter-run and V-flat drives are augmented by tables of drives in all belt sections.—FORT WORTH STEEL & MACHINERY COMPANY, P. O. Box 1038, Fort Worth, Texas.

W-29 **SAFETY EQUIPMENT** — Catalog No. 54A, 24 pages—Illustrates and describes protective equipment. Includes chemical reference charts, glove selector guide, and information on use and care of all-neoprene, synthetic, and natural rubber safety gloves for industrial use.—CHARLESTON RUBBER COMPANY, Stark Industrial Park, Charleston, S. C.

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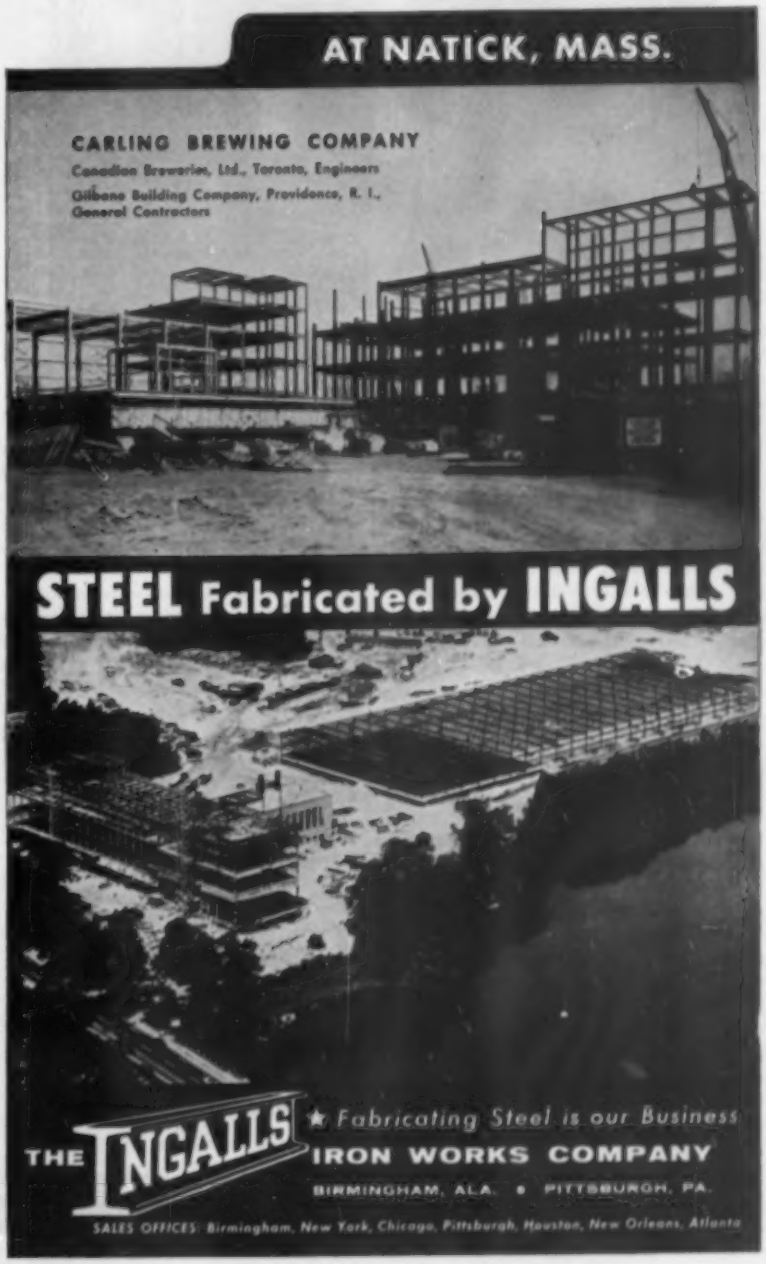
W-30 **INDUSTRIAL TRAPS** — Bulletin No. 500, 12 pages—Illustrates and describes the "Unitrap," an all purpose, universal steam trap for pressure ratings of 0 to 250 lb. Covers design, construction, operation, and other pertinent information. Includes steam pipe selection chart.—PERFECTING SERVICE CO., 532 Atando Ave., Charlotte, N. C.

W-31 **MAINTENANCE CLEANING**—Dowell Service Bulletin, 2 pages—Tells how Dowell service is a modern application of preventive maintenance; problem, method, results, and general discussion, with chart and photographs. Case history of application in a chemical company is included.—DOWELL INCORPORATED, P. O. Box 536, Tulsa 1, Okla.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(Starts on Page 12)

First "Canned Motor-Pump"—Virginia Utility

THE VIRGINIA ELECTRIC POWER COMPANY has put into service at its Possum Point generating station the first "canned motor-pump" ever used to circulate boiler feed water in a closed-loop system. Built by the Westinghouse Atomic Equipment Department, this is the first industrial application of the canned motor-pump.

How Pump Operates

The canned motor-pump is a hermetically-sealed unit that provides a means of circulating a liquid coolant or other fluids in high-temperature, high-pressure, closed-loop systems with zero leakage. All parts in contact with the circulated fluid are made of corrosion-resistant alloys. There are no external shaft seals, and the suction and discharge nozzles are welded into the pipe that forms the closed-loop system. The fluid is permitted to circulate throughout the pump drive motor: through the bearings (this is how they are lubricated), and the magnetic gap. The windings are protected from the hot coolant liquid by lining the stator bore with a cylinder or "can" of thin nickel alloy sheet, welded leak-tight in place. The rotor is "canned" in a similar manner for the same reason.

The canned motor-pump in the Possum Point generating station circulates 4700 gpm of 605 degree F water at 1725 psi continuously, taking suction from the steam drum and pumping through the boiler back to the drum. It is driven at a constant speed of 1800 rpm by a 150-hp, 440-volt, 3-phase, 60-cycle motor.

Aside from the zero-leakage feature of the canned motor-pump—a feature of signal importance in a closed-loop boiler feed water system—it offers other advantages. First of all, being small and light, it is extremely simple to install: lower in place and connect two services—cooling water lines and 440-volt a-c power. Secondly, the instrumentation is minimal: a cooling water flow indicator and a pump-bearing thermocouple—both are connected to light and buzzer circuits. And finally, being an hermetically-sealed unit, it can operate without an injection water bleed and since there are no external shaft seals, maintenance problems are greatly simplified.

Fluor Corp. Establishes Separate Products Div.

J. P. WISEMAN, president of the Fluor Corporation of Canada, Ltd. for the past two and a half years, has been named to head a newly established products company of the Fluor Corporation, Ltd.

According to company officials, the decision to set up a separate products company was prompted by the desire to obtain greater opportunities for growth in the manufacturing field and for increased operating efficiency. Up to the present, products activities have been performed by an operating division within the comany framework.

Fluor's products division has been responsible for the manufacture, sale and erection of natural draft and induced draft cooling towers, as well as other products, including pulsation dampeners and pulsation dampening systems, mufflers for noise reduction of gas engines, and gas cleaners for the removal of both liquids and solids from natural gas.

Copes-Vulcan, Tennessee

COPES-VULCAN DIVISION of Continental Foundry & Machine Co., announces the appointment of Dickey Engineering, KNOXVILLE, TENNESSEE, as representatives for Copes-Vulcan products, including the new Copes-Vulcan boiler controls with instrumentation by Taylor.

Tennessee Eastman High Purity Hydrogen Plant

TENNESSEE EASTMAN COMPANY, KINGSPORT, TENN., a division of the Eastman Kodak Company, has awarded a contract to THE GIRDLER COMPANY, LOUISVILLE, KY., a division of the National Cylinder Gas Company. The contract calls for Girdler to engineer and supply equipment for a high purity hydrogen plant to be located at KINGSPORT, TENN. The plant will be erected by Bays Mountain Construction Company and Tennessee Eastman, and completion is anticipated about the first of the year.

Turbine Generator For International Paper Co.

The largest steam turbine-generator in the paper industry will be built for the INTERNATIONAL PAPER COMPANY by the GENERAL ELECTRIC COMPANY.

The 40,000 kilowatt single automatic-extraction condensing unit will be installed in the paper company's new $20,000,000 newsprint mill being built adjacent to its present SOUTHERN KRAFT DIVISION mill in MOBILE, ALABAMA.

The turbine for this unit will operate at a throttle pressure of 1450 lb/sq in. at 1000 F. This is the highest steam pressure and temperature of any turbine presently being used in the paper industry. Shipment is scheduled for the middle of 1956.

Diamond Alkali—Memphis

Customer service activities having expanded constantly during the past few years, the MEMPHIS BRANCH SALES OFFICE of DIAMOND ALKALI COMPANY will be known henceforth as the Southeastern District office.

The newly-designated name has been adopted because it is more fully in keeping with the increased territorial coverage presently handled by Diamond's Memphis-located organization.

With an office force of seven and a staff of 12 sales and service representatives, the company's Southeastern District Office is responsible for the sale of Diamond caustic soda, chlorine and related or derivative chemicals in the states of ALABAMA, ARKANSAS, FLORIDA, GEORGIA, MISSISSIPPI, NORTH CAROLINA, SOUTH CAROLINA, and TENNESSEE.

With Diamond's chlorine-caustic soda plant at Muscle Shoals, Alabama, now in full production, this office will now cover the entire southeast.

Thomas M. Creel, operating out of Atlanta, Georgia now brings you immediate factory service and engineering assistance on installation and use of nationally known Cambridge products:

The Cambridge Wire Cloth Co.
Cambridge, Maryland

WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

OFFICES IN LEADING INDUSTRIAL AREAS

Meet Tom Creel

new Cambridge Sales Engineer for the Southeast

WOVEN WIRE CONVEYOR BELTS
combining movement with processing

INDUSTRIAL WIRE CLOTH
Bulk or Fabricated Parts

SPECIAL METAL FABRICATIONS
Crates, Baskets, Racks, Trays

Call Tom at any time - - - Ask your operator to get you The Cambridge Wire Cloth Company, Atlanta, Georgia.

install peak performance into your compressors (AIR · GAS · AMMONIA)

Peak performance, maximum efficiency, greater output, and lower power costs can be built into your oldest, and of course your newest, compressors by the installation of VOSS VALVES.

Check **THESE VOSS VALVE ADVANTAGES:**

✓ Quiet, vibration-free operation ✓ 20 to 60% more valve area ✓ less power consumption ✓ minimum pressure loss ✓ normal discharge temperature ✓ lower operating costs ✓ utmost safety

Our detailed proposal for increasing the efficiency of your compressor will be sent you without obligation. Send us the name, bore, stroke, and speed of your machine.

VOSS VALVES / J. H. H. VOSS Co., Inc. 784 East 144th Street, New York 54, N. Y.

News for the South and Southwest (continued)

New Station for VEPCO

VIRGINIA ELECTRIC AND POWER COMPANY has retained Stone & Webster Engineering Corporation to design and construct a new dual purpose power station of 165,000 kw capacity on the York river about six miles east of YORKTOWN, VIRGINIA, to cost more than $20,000,000.

This is the first power plant designed specifically to use a new refinery by-product as fuel. This fuel, known as "delayed coke," will be supplied by the American Oil Company which is building a large refinery on adjacent property.

The new station will contain a 1,200,000 lb/hr steam boiler which will operate under pressure of 2,000 lb/sq in. at superheater outlet and an initial temperature of 1000 F with reheat to 1000 F. The turbine generator which will have a rated capacity of 150,000 kw is the first preferred standard turbine to be designed by General Electric Company in that large size.

The three fuels to be used—delayed coke, coal and refinery gas—will be fired simultaneously. The power station will be set up to use 100 per cent coal and up to 85 per cent delayed coke, as circumstances warrant. Solid fuels will be pulverized.

The power station will be a functional semi-outdoor type. A steel structure with corrugated asbestos siding will house the turbine and the firing aisle with the boiler outdoors. A service building containing offices, shops and warehouse will also be built of steel and asbestos. It will have a total floor area of 22,200 sq ft, of which 5,000 sq ft will be for air-conditioned offices. Completion is scheduled for July, 1957.

Three Bailey Meter Offices Move to Larger Quarters

The Atlanta, Dallas, and Memphis District Offices of Bailey Meter Company have moved to larger quarters. The company, whose headquarters are in Cleveland, manufactures industrial instruments and automatic controls for power and process industries.

The ATLANTA office, under the managership of M. J. MCWHORTER, is located at 1145 Peachtree St., N.E., Room 3090, Atlanta 5, Ga. The Atlanta staff includes Instrument Engineers J. W. Cunningham, W. R. Cunningham, V. D. Kemp, J. R. Lynch and C. W. Berry.

The DALLAS office, under the managership of F. D. KRUSEMARK, is located at 6615 Snider Plaza, Room 211, Dallas 5, Texas. Krusemark is assisted by P. B. Newell.

Under the managership of R. E. BYERS, the MEMPHIS office is located at 3355 Poplar Ave., Memphis 11, Tenn.

Cook Electric—Kansas

COOK ELECTRIC COMPANY, Chicago 14, Illinois, has opened a new district office at 6405 East Kellogg, Wichita, Kansas, with E. W. WILBERT as District Manager.

Jeffrey Opens New District Office at Raleigh, N. C.

THE JEFFREY MANUFACTURING CO., Columbus 16, Ohio, announces the opening of a new district office in Raleigh, North Carolina, under the management of J. R. BRISLEY. Located at 116 South Harrington St., the office will promote and sell products of Jeffrey's Conveyor Division in North Carolina and a part of Virginia.

Mr. Brisley joined Jeffrey in 1945, transferred to the company's Philadelphia office in 1947 and in 1949 was made manager of the Baltimore office.

Jeffrey is a leading producer of transmission machinery, conveying, processing and mining equipment, and is also engaged in contract manufacturing.

Jess McMurry Director of Crane Field Organization

JESS A. MCMURRY has been named director of branches for Crane Co., Chicago, Frank F. Elliott, president, has announced. Mr. McMurry formerly was a district manager with headquarters at Dallas.

He will have full responsibility for the operation of all activities of Crane's field organization.

Mr. McMurry joined Crane Co. in 1917 at its Atlanta branch, and was appointed manager of the company's New Orleans branch in 1940. He had been a district manager since 1945.

When Old Man Winter Starts to Blow

Engineers and maintenance men begin to check on maintenance items when they feel a nip in the air. These men know that now is the time to check their supply of handhole and manhole gaskets, packing hooks, sheet packing, asbestos tape, gasket cutters, etc. These men also know that whatever *your* packing need – Allpax has the answer.

SEND FOR OUR NEW CATALOG TODAY!

See our complete line of packings, tools, and gasket materials. Contact our distributor or write to:

THE ALLPAX COMPANY
805 Mamaroneck Ave. • Mamaroneck, N. Y.

Lynn Now Gen. Sales Mgr. of The Parkdale Company

THE PARKDALE COMPANY, Los Angeles, California, manufacturer of Beam Butane-Propane Carburetion Equipment, has announced the appointment of HAROLD (BOB) LYNN as general sales manager, according to L. C. Zonker, president and general manager. Mr. Lynn will handle all national and foreign sales and supervise the company's increasing number of distributors and dealers.

Mr. Lynn's background in the Liquefied Petroleum Gas Industry dates back nearly twenty years when he established Wilmington Fuels in 1937. In 1946 he disposed of his interest and established Helco Products, manufacturers of domestic regulators, which he ran himself. He sold this company in 1952, when he was appointed manager of the L-P Gas Division of Reo Motors, Inc., which position he held until becoming the sales manager of The Parkdale Company.

Louisiana and Texas Repr. for Cleaver-Brooks Co.

The CLEAVER-BROOKS COMPANY recently announced the appointment of the DYKES COMPANY as manufacturers' representative for the sale of Cleaver-Brooks boilers and equipment.

Located at 1012 Market Street in SHREVEPORT, LOUISIANA its territory will include northern Louisiana, northeast Texas and southwest Arkansas.

In Texas, the POWELL EQUIPMENT COMPANY, 7623 Greenstone, HOUSTON, TEXAS, was named manufacturers' agent for 29 counties in southeast Texas surrounding Houston.

Cleaver-Brooks Company manufactures equipment for the generation and utilization of heat. Among its products are oil, gas and combination gas/oil fired stationary boilers, mobile steam boilers, distillation equipment, evaporators and industrial gas and oil burners.

A. M. Rotoli Named Kelite Southeastern Sales Manager

William Sorensen, Executive Vice President of KELITE CORPORATION, has announced the appointment of A. M. ROTOLI as Sales Manager of the Southeastern Region with headquarters at 426 Marietta Street, N.W., Atlanta, Georgia. Mr. Rotoli will direct Kelite chemical and equipment sales in North and South Carolina, Tennessee, Mississippi, Alabama, Georgia, and Florida.

Walworth Company Purchases M & H Valves—Alabama

As a major step in its planned diversification and expansion program, the WALWORTH COMPANY, 113-year-old manufacturer of valves and fittings, has concluded arrangements for the purchase of the assets and business of the M & H VALVE AND FITTINGS COMPANY OF ANNISTON, ALABAMA.

Under the terms of the acquisition, Fred W. Belz, president of Walworth, announced today that stockholders of M & H would receive 5.1 shares of Walworth Company common stock for each common share of the Alabama concern.

In announcing the acquisition, which has been approved by M & H stockholders, Mr. Belz said:

"This acquisition of the M & H company will be an important contribution to Walworth whose volume of business is in excess of $40,000,000 annually. M & H gross volume last year was more than $6,000,000. Historically, M & H has been a profitable organization and should make a substantial contribution to Walworth's expansion program and activities."

M & H is a leading manufacturer and distributor of valves and hydrants for water companies, filtration and sewer disposal systems, fire protection systems and industrial plants. The company was organized thirty years ago and now has approximately 400 employees. M & H will operate as a division of the Walworth Company. All present management and employees will be retained, with policies and operations continuing the same as previously.

The purchase will add modern foundry and machine shop facilities covering 200,000 square feet and a 17-acre plant site to Walworth's regional manufacturing plants.

Walworth, one of the nation's oldest and largest companies in the valve and fittings field, manufactures equipment for the petrochemical, oil, natural gas, paper pulp, railroad, food processing and gas and electric fields.

EXTRA YEARS OF MORE DEPENDABLE POWER

and at less cost per pound of steam

•

TODD BURNERS

GAS OR OIL

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PRODUCTS DIVISION

TODD SHIPYARDS CORPORATION

HEADQUARTERS:

Columbia & Halleck Streets, Brooklyn 31, N. Y.

PLANT:

Green's Bayou, Houston 15, Texas

TODD

CONVERT
for EXTRA POINTS

A firing system that's inadequate and expensive may be eating into your profits . . . unnecessarily! Convert to gas —and increase profits—by cutting labor costs, eliminating coal hauling, ash-removal, flue and tube cleaning. Gas requires less maintenance on equipment, increases efficiency and effects greater savings! Present system can usually be retained as a stand-by.

Consult McBurney Stoker and Equipment Company, makers or suppliers of the best boiler room equipment available, on all problems. If your firing system requires wood, coal, gas, oil or any combination thereof, McBurney Stoker and Equipment Company has designed units to fit your particular needs. They have served industry since 1911, and can offer you the finest equipment, including: Copes-Vulcan Boiler Controls, Copes Feedwater Regulators, Vulcan Soot Blowers, McBurney Underfeed Coal Stokers, Aqua Electric Scale Control, Gas and Oil Burning Equipment.

McBURNEY
STOKER AND EQUIPMENT COMPANY
SINCE 1911
2110 Peachtree Road, N.E.
Atlanta, Georgia
Phone: Elgin 4436

C. B. McMANUS, Pres., Southern Co.; W. S. GINN, General Mgr., Power Transformer Dept., General Electric Co.; and D. B. LAWTON, Plant Mgr., General Electric Co., Rome, Georgia.

52-Year-Old Transformer Monument at Rome, Georgia

A 52-year-old electric power transformer, which survived the San Francisco earthquake, was dedicated at the GENERAL ELECTRIC COMPANY'S Medium Transformer Plant at Rome, Georgia, on Sept. 27, as a monument to the electrical industry's progress during the last half century.

The "Monument to Progress" was dedicated by D. B. Lawton, Plant Manager, in a brief ceremony attended by industrial and government leaders and employees. Participating directly in the ceremony were C. B. McManus, president of the Southern Company, Atlanta, who delivered the dedication address, and W. S. Ginn, General Manager of G. E.'s Transformer Division, Pittsfield, Mass.

A special guest was H. P. Braun, engineer of Pacific Gas and Electric Company, San Francisco, who received a trip to Rome as part of the "Treasure Hunt" prize offered by General Electric for locating the oldest operating G. E. Transformer.

The transformer was found at P. G. & E. substation near Santa Cruz, Calif., where it was still supplying electricity for a cement plant, more than 52 years after it was built in January, 1902, by the Stanley Electric Manufacturing Co. in Pittsfield, Mass. The Stanley Company later became part of General Electric. The transformer was originally installed in San Francisco and came through the 1906 earthquake in good shape.

P. G. & E. received a brand new replacement transformer, manufactured in the Rome plant, as the "Treasure Hunt" prize.

The old transformer had had no major repairs during its 52 years of service, and was scheduled to be retired sometime this year. Rated in the old style at 1,100 kilowatts, it has a steel and cast iron tank about six feet high, and weighs about two tons. A modern unit of about the physical size can handle four times as much power. Modern transformers are rated in kilovolt amperes.

The old transformer has a place of honor at the Rome G. E. Plant, on a pedestal in a landscaped plot. A bronze plaque tells its story.

Rawson and Co.—Houston

LEROY WASHBURN has recently been added to the staff of RAWSON AND CO. to give inside sales assistance and handle office activities of the firm.

Mr. Washburn came to Houston eight years ago and was with Main-

tenance Engineering Corp., until his recent resignation to accept a position with Rawson and Co.

Rawson and Co. is a sales company which offers sales, service, and warehousing facilities to manufacturers interested in the petro-chemical industrial trade area of Texas and Louisiana. Offices are located at 4101 San Jacinto, Houston.

Illuminating Society Southern Vice President

J. D. MITCHELL, southeastern regional engineer for the Westinghouse Lamp Division, has been elected vice president of the ILLUMINATING ENGINEERING SOCIETY'S Southern Region.

One of the largest regions in the Society, the Southern Region reaches from the Carolinas south to Florida, and from the Atlantic coast west as far as Arkansas and Louisiana.

Allis-Chalmers—Atlanta

B. I. KOLSTO is appointed assistant construction machinery sales manager at the Atlanta, Georgia, branch for the Construction Machinery Division, Tractor Group, ALLIS-CHALMERS MANUFACTURING COMPANY. He was formerly a construction machinery salesman at this branch.

STATEMENT

of the ownership, management and circulation required by the Act of Congress of August 24, 1912, as amended by the Acts of March 3, 1933, and July 2, 1946 (Title 39, United States Code Section 233) of SOUTHERN POWER AND INDUSTRY published monthly at Philadelphia, Pa., for October 1, 1955.

1. The names and addresses of the publisher, editor, managing editor, and business manager are: Publisher, W. R. C. Smith Publishing Company, Atlanta 5, Georgia; Editor, Francis C. Smith, Atlanta 5, Georgia; Managing Editor, Richard L. Prices, Atlanta 5, Georgia; Business Manager, Eugene W. O'Brien, Atlanta 5, Georgia.

2. The owners are W. R. C. Smith Publishing Co.; Estate of W. R. C. Smith, Atlanta, Ga.; O. A. Sharpless, Atlanta, Ga.; J. C. Cook, Atlanta, Ga.; W. J. Hooke, Atlanta, Ga.; T. W. McAllister, Windemere, Fla.; E. W. O'Brien, Atlanta, Ga.; Seba J. Jones, Atlanta, Ga.; Mrs. E. L. Philpot, Atlanta, Ga.; Richard P. Smith, Atlanta, Ga.; A. F. Roberts, Atlanta, Ga.; W. C. Herbert, Atlanta, Ga.

3. The known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or any other security holders are: None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

E. W. O'BRIEN, Business Mgr.

Sworn to and subscribed before me this 22nd day of September, 1955.

SEBA J. JONES, Notary Public

My commission expires Feb. 24, 1956.

New Pail Production Line

VULCAN STEEL CONTAINER COMPANY, BIRMINGHAM, ALABAMA has completed the installation of an additional steel pail production line. This new line, which includes modern new paint and lacquer spray equipment and large modern baking ovens, increases the company's production capacity of pails and drums by over 60%. This new equipment also substantially increases capacity for producing pails with Hi-bake interiors. Another production line is proposed for the manufacture of larger sizes of steel shipping containers.

Kendall Mill—Bethune, S. C.

Structural steel is up and the new finishing plant for the KENDALL COMPANY, BETHUNE, S. C. is proceeding on schedule, according to the general contractors, the Daniel Construction Co. of Greenville. The new plant will enclose 321,000 sq ft. It is scheduled to be completed by December 31, 1955 at a cost of more than $5,000,000 and is designed to finish all types of cloth.

Standard Method for Analyzing Sound

THE AMERICAN STANDARDS ASSOCIATION, New York, N. Y., has developed a method for tracking down noise and vibrations and reducing them at the source, which will eliminate hearing loss and dangerous mechanical failure caused by vibrations.

One aid in detecting the din is the just-published American Standard Method for Specifying the Characteristics of Analyzers Used for the Analysis of Sounds and Vibrations, Z24.15-1955. This standard has been prepared to help the user and manufacturer of analyzers not restricted to octave bands, as a much finer analysis is desirable for detecting some noises and reducing them at the starting point. For example, an octave band would give sufficient analysis of room noise, but to quiet a machine of many gears, an analyzer must be sufficiently selective to separate individual components of the noise.

This new standard may be obtained from the AMERICAN STANDARD ASSOCIATION, 70 East 45 Street, New York 17, N. Y. Price is 50 cents per copy.

For High Temperature-High Pressure Sealing

DURA SEAL TYPE P.T. is the engineered mechanical seal for meeting severe sealing conditions. Pressures from 50 psi to 1000 psi . . . temperatures from minus 80°F. to 450°F. For sealing all fluids except molten alkali metals and some fluorine compounds in the higher temperatures. For information on applications . . .

Write today for Dura Seal Catalog No. 455-SP

DURAMETALLIC CORPORATION, Kalamazoo, Michigan

THERMOBLOC

DIRECT-FIRED UNITS

provide simple, low-cost heat

For large unpartitioned areas in warehouses, factories, auditoriums or supermarkets. THERMOBLOC provides gently circulated warm air that assures customer and employee comfort.

Complete automatic control automatically regulates heat and retards air fans until heater is warmed up. This feature eliminates cold blasts during first few minutes of start-up.

Nine models from 100,000 btu to 2,250,000 btu output assures a size or combination of sizes to fit the exact needs of your plant.

THERMOBLOC OFFERS THESE ADVANTAGES

- Cost less than conventional types of installations.
- Operation cost lower than other heating methods.
- Circulates heat fast . . . within 90 seconds after start-up.
- Does not require constant attendant. Automatic temperature and safety controls always on guard.
- Direct heat circulation. No pipes and radiators. Normally does not require ducts although ducts can be specified to heat offices, washrooms, etc.
- Easily relocated when necessary.
- Can be furnished to burn oil or gas, or both on specification.

Investigate THERMOBLOC today for the answer to your heating problem.

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Division of
PRAT-DANIEL CORPORATION
SOUTH NORWALK • CONNECTICUT
Manufacturers of P-D Power Equipment

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Name ..... Title .....
Company .....
Address .....

News (continued)

Hammel-Dahl Company Tulsa Office

The HAMMEL-DAHL COMPANY of Providence, R. I., manufacturers of automatic control equipment, announces the opening of their new sales office in Tulsa, Oklahoma. The office, under the supervision of their new district sales manager, PAUL E. BOWLES, will be located at 310 Thompson Building in Tulsa.

Paul E. Bowles

The opening of this new company office will enable Hammel-Dahl Company to offer complete sales and service on their automatic control valves, which are employed in chemical and petroleum processing.

American Brake Shoe—Houston

The RAMAPO AJAX DIVISION of American Brake Shoe Company has appointed ROBERT L. CARMICHAEL district sales manager. Mr. Carmichael, formerly a sales representative, started with the division in 1946. He will be located in the Brake Shoe sales office in Houston, Texas.

J. F. Pritchard—Arizona

THE CONE AND WALLACE COMPANY, PHOENIX, ARIZONA, has been appointed sales representative for the state of Arizona by J. F. PRITCHARD AND COMPANY OF CALIFORNIA, a division of J. F. Pritchard and Company, Kansas City, Missouri, manufacturer of cooling towers, for air-conditioning and industrial applications, and Pritchard Hydryers, packaged dehydration units for drying air or other gases.

A-4873A

ALLIS-CHALMERS

L. B. Foster Co. Warehouse in Atlanta

A six-acre warehousing area for fabrication and storage of steel sheet piling, pipe and railroad trackage has been opened in ATLANTA by the L. B. FOSTER COMPANY to provide faster service for Southeastern customers.

The move follows Foster's recent opening of an Atlanta office at 805 Peachtree Street under the direction of Paul A. Duke, regional manager.

Items stocked include steel sheet piling, rail and track accessories, steel pipe of sizes ranging from ⅛ to 30 inches, special structural grade pipe, H-bearing pile, foundation pipe for piling, lightweight steel sheet piling and crane rail. Supplementary stocks also will be maintained at other points in the South and Southeast.

Hindman Mgr. of La. Div., Texas Gas Transmission

E. F. HINDMAN, former general superintendent of two south Louisiana subsidiaries of Texas Gas Transmission Corp., has been named manager

of the newly-created Louisiana division of the company.

The division, which will have headquarters in Lake Charles, was formed following the recent merger of Louisiana Natural Gas Corp. and Texas Northern Gas Corp. into Texas Gas. Its operations will consist primarily of gathering gas from South Louisiana fields for the Texas Gas system. General offices for Texas Gas are in Owensboro.

Lane-Wells—Louisiana

Increased activity in the area has prompted the LANE-WELLS COMPANY, one of the Dresser Industries, to several new appointments in Louisiana. The new assignments, just announced by J. M. HENDERSON, Gulf Coast Division Manager, include the following: E. H. BARKER to the post of District Sales Engineer at Lake Charles; E. V. CLEVELAND to District Sales Engineer at Shreveport; H. R. CASSITY to Vivian as Operator-in-Charge. Also announced was the promotion of W. H. REDFORD from District Sales Engineer in Shreveport to Division Sales Engineer in Midland, Texas.

Nitroparaffin Production—La.

The textile, surface coatings, petroleum, photographic and chemical specialties industries will be the largest initial users of nitroparaffins now flowing from COMMERCIAL SOLVENTS CORPORATION'S new plant at Sterlington, Louisiana.

S.A.S.I. Wins Award For Public Relations Effort

The SOUTHERN ASSOCIATION OF SCIENCE AND INDUSTRY was named winner of the award given annually by the Advertising Federation of America for the top regional public relations program. SASI is a non-profit, non-political organization founded in 1941 to promote the study and development of the resources of the South.

Presentation of the award was made at a banquet session of the Deep South meeting of the AFA at Birmingham. The announcement was made by Coca Cola Company advertising executive Arthur E. Burdge, who is District Governor of the AFA.

National Industrial Electric Heating Conference—Cincinnati—Feb. 6-10th

Up-to-date technical information on the entire field of industrial electric heating, together with sales aids and ideas to help put this information across, will be available to power sales engineers and supervisors at the NATIONAL INDUSTRIAL ELECTRIC HEATING CONFERENCE to be held at the Netherland Plaza Hotel, Cincinnati, Ohio, February 6-10, 1956.

The purpose of this Conference is threefold: (1) to present the latest technical information, sales aids and sales training ideas to industrial heating specialists and power sales engineers, (2) to provide an exchange of the most recent information on industrial electric heating between the manufacturers of this type of equipment and the utilities supplying electric service, and (3) to enable those in attendance to carry this information back to their organizations for further dissemination among their own personnel.

An entirely new session on markets and selling has been developed for this year's Conference. It will be of special benefit to power sales engineers and supervisors and will cover the principal factors leading to the development of a successful sales campaign.

The latest technical information in the field of industrial electric heating will be provided by authorities affiliated with the leading manufacturers, also case histories and sales information, by carefully selected, experienced utility personnel.

An entirely new program has been developed for this year's Conference. It was formulated after members of the Council and of the Edison Electric Institute's Industrial Power and Heating Group were canvassed for ideas and suggestions. The program will cover the entire field of industrial electric heating, including such relatively new subjects as titanium, zirconium, vacuum melting, vacuum heat treating, space heating and industrial use of the heat pump.

Although essentially the same format as last year will be followed, in several instances case histories will be stressed, with particular emphasis on how the job was sold.

Use REMA to add years of life to your Belts

REMA is the New and Amazing Self-Vulcanizing Rubber Repair Material

REMA REQUIRES
- NO HEAT
- NO HEAVY EQUIPMENT
- NO CURING TIME DELAY

• REMA is not just another cold patch. REMA is vulcanization by chemical process. The repaired area is sealed with an abrasive resistant cover stock patch. No heat or heavy vulcanizing equipment required. Here's the astonishing advantage—*when repair work is completed belts may be returned to service immediately.*

• REMA seals out moisture, reduces mildew, rot and deterioration — the great enemies of conveyor belts. Your own maintenance man can quickly repair your belt — it doesn't take a skilled belt mechanic to use REMA.

• Used for repair of all types of damaged spots, edge wear and for covering metallic joints. Available in introductory kits or parts separately.

Order from your Flexco-Alligator distributor

Write for Folder No. R4

FLEXIBLE STEEL LACING CO.

4625 Lexington St., Chicago 44, Ill.

REMA SELF-VULCANIZING RUBBER REPAIR MATERIALS

4 EASY STEPS TO BETTER PRODUCTION HEAT

1 Call in

the experienced Chromalox Electric Heating Specialist serving your area. He's as near as your phone.

2 Talk over

your heating plans and problems. You'll be given "case histories" of successful applications similar to your own.

3 Work out

the details of your application with the Chromalox Heating Specialist. Tell him what you want to accomplish in the way of results.

4 Follow Through

on the recommendations. Order the Chromalox Electric Heaters and controls needed for your application. You'll be more than pleased with the time, money and material saving results you'll get with Chromalox Electric Heat!

At Your Service

A STAFF OF EXPERIENCED APPLICATION ENGINEERS

SEND FOR "101 WAYS" HANDBOOK and address of Chromalox Engineer serving you.

A-4431

EDWIN L. WIEGAND CO., Industrial Division
7563 Thomas Blvd., Pittsburgh 8, Pa.

☐ Send me 101 Ways to Apply Electric Heat handbook.

☐ Have a Chromalox Heating Specialist call

Name.....

Company.....

Street.....

City.....Zone.....

State.....

CHROMALOX
ELECTRIC HEAT FOR MODERN INDUSTRY

SALES ENGINEERING REPRESENTATIVES — Atlanta 9, Ga.—C. B. Rogers and Associates, 1000 Peachtree St., N. E.; Charlotte 3, N. C.—Eanes, Wallace & Co., 1164½ East Fourth St.; Dallas 26, Texas—L. R. Ward Co., 2009-11 Canton St.; Houston 3, Texas—L. R. Ward Co., 1814 Texas Ave.; Nashville 4, Tenn.—H. R. Miles and Associates, 2500 Franklin Road.

News for the South and Southwest (continued)

Byron-Jackson—Houston

Appointment of J. L. Stewart as Assistant Regional Manager, Pumps, in the Houston office of Byron Jackson Division of Borg-Warner Corporation, has been announced.

J. L. Stewart

"Jack" Stewart has been with BJ since 1947 and most recently was in charge of the Dallas district office.

International Nickel Opens Southeast Technical Section

THE INTERNATIONAL NICKEL COMPANY, INC., recently announced the opening of the Southeast States Technical Field Section, Development and Research Division, with headquarters at 3179 Maple Drive, N. E., Atlanta, Georgia. Embracing the States of North Carolina, South Carolina, Georgia, Florida and Alabama, the new Section will furnish industry in the area with technical information and assistance relating to alloys containing nickel.

RICHARD J. GREENE, Metallurgist, is in charge of the Section. He joined International Nickel in February, 1945, as a metallurgist on the staff of the company's Research Laboratory at Bayonne, New Jersey, and prior to his present appointment was a member of the Central Atlantic Coast Technical Field Section in New York City.

Cooper-Bessemer Houston Office

The assignment of S. N. CAMPBELL to its HOUSTON office has been announced by THE COOPER-BESSEMER CORPORATION. In his new capacity, Mr. Campbell will handle the engineering and sales of centrifugal, motor, and engine driven compressors for pipe lines, refineries, petro-chemical, and industrial plants in the Houston area.

A graduate of the University of Texas, Mr. Campbell has served in the Cooper-Bessemer compressor engineering section at the headquarters plant in Mount Vernon, Ohio. He spent a period of time in the Los Angeles area before his present appointment.

J. P. Stevens Plant—Ga.

Ground has been cleared and construction is proceeding on schedule for the new J. P. STEVENS & CO., INC., woolen mill at Dublin, Ga., according to the general contractor, Daniel Construction Co. of Greenville, S. C.

The new mill will occupy an area of approximately 220,000 sq ft of a 300-acre site, and will be air-conditioned and fluorescent lighted. The plant will manufacture woolen fabrics and is scheduled for completion by the end of this year.

Goodyear Expands Houston Rubber Plant

Plans for a substantial expansion of the Goodyear synthetic rubber producing facilities at Houston, Texas, were recently announced.

The Houston plant, acquired from the government, will be enlarged in two stages which will ultimately provide a fifty per cent increase in capacity.

Republic Steel—Charlotte

REPUBLIC STEEL CORPORATION will build a 75,000 sq ft warehouse in Charlotte, N. C. Work will begin immediately on the project, which is scheduled for completion in the spring of 1956. About 55 sales, clerical and warehouse employees will staff the facility when it is completed.

The new warehouse, which will include 4500 sq ft of office space, will serve North Carolina, South Carolina and part of Georgia. This territory now is being served by company warehouses in Baltimore and Chattanooga.

Temco Appointments—Dallas

WILLIAM N. RATHBUN, former chief industrial engineer at TEMCO AIRCRAFT CORPORATION, has been named plant facilities engineer for the Dallas firm. JAMES F. PARRISH was elevated from general supervisor to succeed Rathbun as chief industrial engineer.

Rathbun's responsibilities in the newly-created facilities position will include administration of the company's Navy facilities contract, negotiations pertaining to real property and equipment, and special assignments.

Micro-Lube Sales—Dallas

WALTER TREFZ has joined MICRO-LUBE SALES, Dallas, Texas, as Technical Service Director. He will work with maintenance Engineers and Technicians in the power plant, transportation, and automotive industries, and will assist all users of internal combustion engines with problems of lubrication.

KCP&L Officers

J. A. KEETH, manager of production for KANSAS CITY POWER & LIGHT CO., since 1934, has been named a vice-president of the company and assigned to special engineering duties.

H. B. Munsell, president, said Mr. Keeth will be in charge of constructing Montrose Station, large steam-electric generating plant being built in Henry County, Missouri, 65 miles southeast of Kansas City. He also will engage in engineering studies in connection with a nuclear power project in which KCP&L is associated with other utilities in Nuclear Power Group, Inc.

Walex Metal Products' Southern Distribution

Walex corrosion resistant permanent aluminum jacketing is now being extensively distributed throughout the South and Southwest. MR. ED TRACEY, general sales manager of WALEX METAL PRODUCTS COMPANY, Box 7413, HOUSTON 8, TEXAS, recently announced that the following distributors are now warehousing and selling the jacketing to manufacturing, utility, and service plants:

ALLIED SERVICES, INC., 160 Spring Street, CHARLESTON, W. VA.; A. G. BRAUER SUPPLY CO., 2100 Washington Avenue, ST. LOUIS 3, MISSOURI; EAGLE ASBESTOS & PACKING CO., INC., 2500 Earhart Boulevard, NEW ORLEANS 11, LOUISIANA; GENERAL INSULATION & RFG. CO., INC., 116 North Third Street, LOUISVILLE 2, KENTUCKY; INSULATION ENGINEERS, INC., Craft Highway & Conception Street Road, MOBILE, ALABAMA; JAMAR-OLMEN CONSTRUCTION COMPANY, 1002 East 19th Street, KANSAS CITY, MISSOURI; C. E. THURSTON & SONS, INC., 30-32 Commercial Place, NORFOLK 10, VIRGINIA, and STARR-DAVIS COMPANY, INC., GREENSBORO, NORTH CAROLINA.

NORTH BROTHERS are also established distributors in the Southeast, with offices at Boulevard at Eighth Street, N.E., ATLANTA, GEORGIA; 4360 Powell Avenue South, BIRMINGHAM, ALABAMA; Seaboard Park, P. O. Box 3203, COLUMBIA, S. C.; 1021 Maryville Pike, KNOXVILLE, TENNESSEE; 1214 West Robinson Street, ORLANDO, FLORIDA; 644 W. River Street, SAVANNAH, GEORGIA; and 30-32 Commercial Place, NORFOLK 10, VIRGINIA.

Allis-Chalmers—Richmond

BRUCE C. HALSTED has joined the Richmond office of Allis-Chalmers industries group as a sales representative, according to an announcement by Charles W. Parker, Richmond district manager.

New Officers for Atlanta's John M. Avent & Associates

The Board of Directors of JOHN M. AVENT & ASSOCIATES, INC., Consulting Management Engineers of Atlanta, Georgia, has recently announced changes in the organization of the company due to the death of its president, John M. Avent.

J. S. CREEL, Professional Engineer, has been appointed president and EDWARD B. RUSSELL, vice president. Both Mr. Creel and Mr. Russell who have been with the company for some time hope to continue to give the high quality of service to Southeastern industries that it has been known for in the past.

Established in 1950, the company has been serving a variety of Southeastern industries in all phases of management and industrial engineering techniques.

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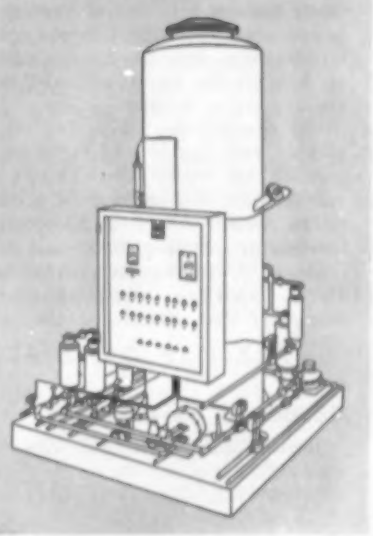

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News for the South and Southwest (continued)

Worthington Expansion

WORTHINGTON CORPORATION has purchased from The Elliott Company the fifteen-acre factory site in the Ampere Section of East Orange, and Newark, N. J.

The acquisition will be used to partially accommodate two of the company's major product divisions: the manufacture of large central station air conditioning equipment; and the manufacture of standard pumps.

The headquarters offices for engineering, sales and service for Worthington's air conditioning and refrigeration division will be moved to the Ampere site from its present location at Harrison, N. J. and will continue to be under the direction of M. M. Lawler, vice-president in charge of that division, at the new location.

Continental Gin—Officers

ROBERT S. LYNCH was recently elected Chairman of the Board of the CONTINENTAL GIN CO., succeeding GEORGE W. WOODRUFF, who was named Chairman of the Executive Committee. Mr. Lynch, President of the Atlantic Steel Company, will continue in that capacity with the Atlanta firm.

MERRILL E. PRATT will continue as President of the Continental Gin Company, which position he has held since 1934. A. L. SMITH was named Honorary Chairman of the Board after having served for many years as Vice-President, President, and Vice-Chairman of the Board. No other changes in officer personnel were made.

Panellit Forms New Instrument Services Div.

PANELLIT, INC. Skokie, Illinois, has announced formation of the new Instrument Services Division to fulfill demands for engineering facilities outside the normal range of company activities.

The new division will provide consulting and installation services in the field of instrumentation and automation. Included will be overall instrumentation studies and surveys, control system design and comprehensive project supervision. The new Panellit division also handles complete installation of instrument and control equipment including inspection, calibration, check-out and plant start-up.

NEIL M. BLAIR has been appointed manager of the Panellit Instrument Services Division.

Du Pont Building Paint and Warehouse—Atlanta

THE DU PONT COMPANY will build a paint plant at Tucker, 13 miles northeast of Atlanta, and a sales office and paint service warehouse building in Atlanta's Chattahoochee district, according to CHARLES P. CULP, regional sales manager of the Company's Finishes Division.

It is expected that plant construction will begin this fall and that operations will start in late summer 1956. The plant, to be built by the Du Pont Company's Engineering Department, will employ about 80 persons.

The plant will manufacture paints, enamels, and thinners for household, industrial, automotive, and automotive refinish use. Embodying the most advanced ideas on equipment and layout, the plant will consist of a two-level manufacturing and warehouse building of steel frame construction with brick walls. This building will comprise 80,000 sq ft of floor space. In addition, there will be one-story buildings for offices, change house, service facilities, garage, and thinner manufacturing area. Two railroad sidings will be provided to serve both upper and lower plant levels. There will also be a tank farm for storage of raw materials.

The new sales office and warehouse building will replace the regional sales office and paint service warehouse now operated at 619-21 Peachtree Street. It will be a one-story, 30,000 sq ft building on a two-acre site on the east side of Booker Street near Chattahoochee Avenue about four miles from the downtown retail district.

The office-warehouse will be built by the McDonough Construction Company of Georgia and leased to the Du Pont Company.

Decision to proceed with the two projects at this time, Mr. Culp said, was spurred by the vigorously expanding economy of the Southeastern area, for which Atlanta is the major sales, manufacturing, and distribution center.

H. D. Greenfield Retires from Whiting Products—S.C.

WHITING PRODUCTS COMPANY, Camden, South Carolina, manufacturers of industrial and material handling equipment, recently announced the retirement, as partner, of COL. HORACE D. GREENFIELD and the admission as general partners of William E. Maye and Gordon W. Watson. Mr. Maye and Mr. Watson have been supervisory employees for some time.

William S. Whiting, Jr., and Henry Whiting are continuing partners. Col. Greenfield will represent Whiting Products on special engineering sales.

Whiting Products was started at the end of World War II by William S. Whiting, Jr., then Assistant Chief Engineer, Sonoco Products, Hartsville, S. C. Production operations were transferred to Camden, South Carolina, in 1947. Manufacturing buildings, totaling 30,000 sq ft, are fully equipped for a wide range of machine shop work, welding, sheet metal, structural, and assembly.

The company is widely known throughout the Southeast as a producer of textile conveyors and general industrial handling devices.

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Florida Gear Manufacturer Buys Detroit Company

FROHMAN MANUFACTURING COMPANY, INC.—largest manufacturers in the South of gears and gear assemblies for aircraft, missiles and precision instruments, has entered a new field that will materially enlarge the scope of its activities.

Announcement was made by Harry Frohman, president, of the purchase of the Turbine Products Division of Detroit Broach Company, including its plant and equipment at Boca Raton, Florida. Frohman operates other plants in Miami and Ft. Lauderdale.

The acquisition, to be known as the Turbine Products Division of Frohman Manufacturing, produces motor and spline shafts, tie-rods and tie-bolts for jet aircraft engines.

During the last five years, Turbine Products has been a principal source for these special jet engine parts, having supplied them for use in the J-47 jet engine program for the Aircraft Engine Division of Ford Motor Company, the J-35 jet engine program for Allison Division of General Motors, and parts for other engine manufacturers such as Studebaker-Packard and Bridgeport-Lycoming.

L. O. F. Glass Fibers Southern Representatives

ROBERT E. SIMPSON has been appointed sales manager of the Southwest region with headquarters at HOUSTON, and ROBERT N. HEYMAN was made district manager of the DALLAS area for the L. O. F. GLASS FIBERS COMPANY, TOLEDO, OHIO.

The new L. O. F. Glass Fibers Company, formed by a merger of the Fiber Glass and Corrulux Divisions of Libbey-Owens-Ford Glass Company with Glass Fibers, Inc., produces glass textile yarns, roving, mats, thermal and acoustical insulation. The company has branch offices located in principal cities and general offices in Toledo, Ohio.

How to Specify Packaged Boilers

(*Starts on page* 62)

longer life with less maintenance when operated at the SBI rating. Manufacturers that rate their boilers in this manner are usually able to offer a certified output rating that results in the boiler being able to develop 150% continuous rating.

The advantage of this is important when two boilers are selected to meet the design load based on SBI rating. In the event of an outage the remaining boiler can easily carry 75% of the design load, and since the design load is the maximum load that will normally be imposed on the heating plant this means that one boiler can often carry the entire load. The owner has thus purchased reserve capacity that can be utilized when necessary.

In preparing the specification it is not necessary to write volumes in order that the engineer may limit the boiler selection to a manufacturer that makes an acceptable product. There are several codes that have been laboriously prepared by eminently qualified experts over a long period of time to insure that the owner may have a satisfactory product. By a careful use of the codes the specification writer has little to do other than specifying the type of equipment that is desired, the control function, and certain limiting capacities that will prevent the possibility of a sub-standard product being installed (see accompanying typical specification).

This article has given consideration to only one installation involving the low pressure packaged steam generator. Another type of installation worthy of consideration is a central plant furnishing space heating for a number of buildings that are grouped fairly close together.

Although piping for low pressure steam will be larger and the initial installation cost greater the additional expense is usually off-set within a brief period of time by the savings in cost for operating personnel and the reduced maintenance of the low pressure installation.

Needless to say, each proposed boiler plant should be the product of an engineering study and analysis by a competent engineer.

Edge Bonding Output Increased 20%

DeSoto Hardwood Flooring Company, Memphis, Tennessee, uses many Sterling Slo-Speeds, reports Mr. J. D. Puckett, Plant Superintendent. The most recent application of Slo-Speed was on a feeder for furniture dimension lumber to a Frick edge bonder, which increased production over 20%, improved morale of employees, and reduced rejects. Sequence of operations is now closely synchronized from glue machine to edge border.

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Report on The Geneva Atomic Conference

(*Starts on page* 39)

commercial exhibits and the general public was admitted. These exhibits were shown independent of government sponsorship and the whole affair was not much different from any industrial fair.

The commercial exhibits presented a real test of what each country is prepared to furnish in the way of reactors and related equipment. For example, the Russians had no commercial exhibit whatever. France, Italy, and Switzerland displayed a number of visionary projects but were obviously unprepared to furnish, on order, anything in proportion to the ambitiousness of their exhibits. Belgium, Germany, Holland, and Lichtenstein offered moderate displays in keeping with their modest offerings.

The only two countries capable of talking business and delivering the goods were England and the United States. The British were out in full force to get all the firm business possible while the United States was handicapped by AEC restrictions on foreign sales and an earnest desire on the part of U. S. industrial firms to promote goodwill by subduing sales pressures.

It was abundantly clear to anyone attending the conference in Geneva that competition for world markets in the atomic energy field rests strictly between the United States and Britain.

About twenty-two U. S. industrial firms sponsored commercial exhibits. Fourteen technical publishers and over thirty technical societies presented a display of more than 100 American periodicals dealing with nuclear energy. Nineteen industrial firms, including Newport News Shipbuilding and Drydock Company, furnished parts of the United States Information Agency's teaching exhibit also shown at the Palais des Expositions.

Technical Information

More than 400 technical papers were presented at the conference by scientists and engineers from 72 countries. The topics discussed ranged through highly theoretical aspects of nuclear physics to the application of atomic energy in the fields of chemistry, biology, medicine, mineral industries, industrial processes and power generation. It is obviously impossible to even list here the titles of the papers let alone to give a summary of the material presented in the papers.

Although more of the technical details of atomic power plants under construction, or planned for the immediate future, in the U. S. and Britain were revealed, nothing new was presented in the way of general information that has not been reported previously in SOUTHERN POWER AND INDUSTRY. However, even general information on the Russian atomic power plant was not available before the Geneva conference and for this reason the details will be given here.

A paper entitled "The First Atomic Power Plant in the USSR and Atomic Power Development Prospects," by D. I. Blokhintsev and N. A. Nikolayev gave a rather frank appraisal of the Russian plant. This atomic power plant went into operation on June 27, 1954, and has produced a total of 15 million kilowatt-hours of electrical energy.

The Russian atomic power plant is designed for an output of 5,000 kw of power and contains a pressurized water reactor utilizing enriched uranium containing 5 per cent of U-235 as fuel. The total charge of fuel is 1210 pounds. The reactor cooling circuit consists of water, under a pressure of 1470 psia, which leaves the reactor at a temperature of approximately 510 F.

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Hence steam is not generated in the reactor itself. Another circuit circulates water and steam which is the working media for the turbines. In effect a boiler in the form of a heat exchanger removes heat from the reactor cooling water thus providing for the generation of steam in the secondary circuit. Steam is produced at a pressure of 185 psia and at a temperature of 495 F.

Of greater interest to American engineers is the operating experience of the Russians. According to the authors of the paper there have been no operating failures due to the fuel elements, the circulating pumps or any of the major components of the system. They were careful to point out that all welded joints were critically examined before the unit went into operation. No cases of excess-radiation of personnel have occurred since the plant went into service.

An interesting sidelight on the Russian atomic power plant is a statement made by some Indian observers who were invited to inspect the plant. According to the Indians the plant was apparently built on a tight budget. Although, there was no stinting on safety devices, bare wires and carelessly taped wires were observed around the instrument panels. The lighting fixtures for the control panels were of ancient vintage and the conventional instruments appeared to be second hand. The building itself was described as "very austere" and such things as the toilet facilities at the plant were characterized as "primitive."

Readers who are interested in seeing copies of the papers presented at the Geneva conference should check with the librarians of their State Universities. The UN plans to deposit copies of the papers with selected libraries in all sections of the country.

Books for the Plant Engineer

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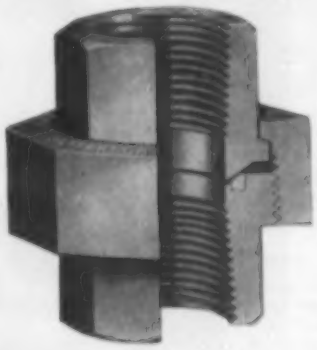

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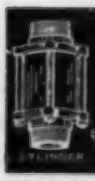

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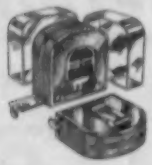

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JENKINS PRACTICAL PIPING LAYOUTS

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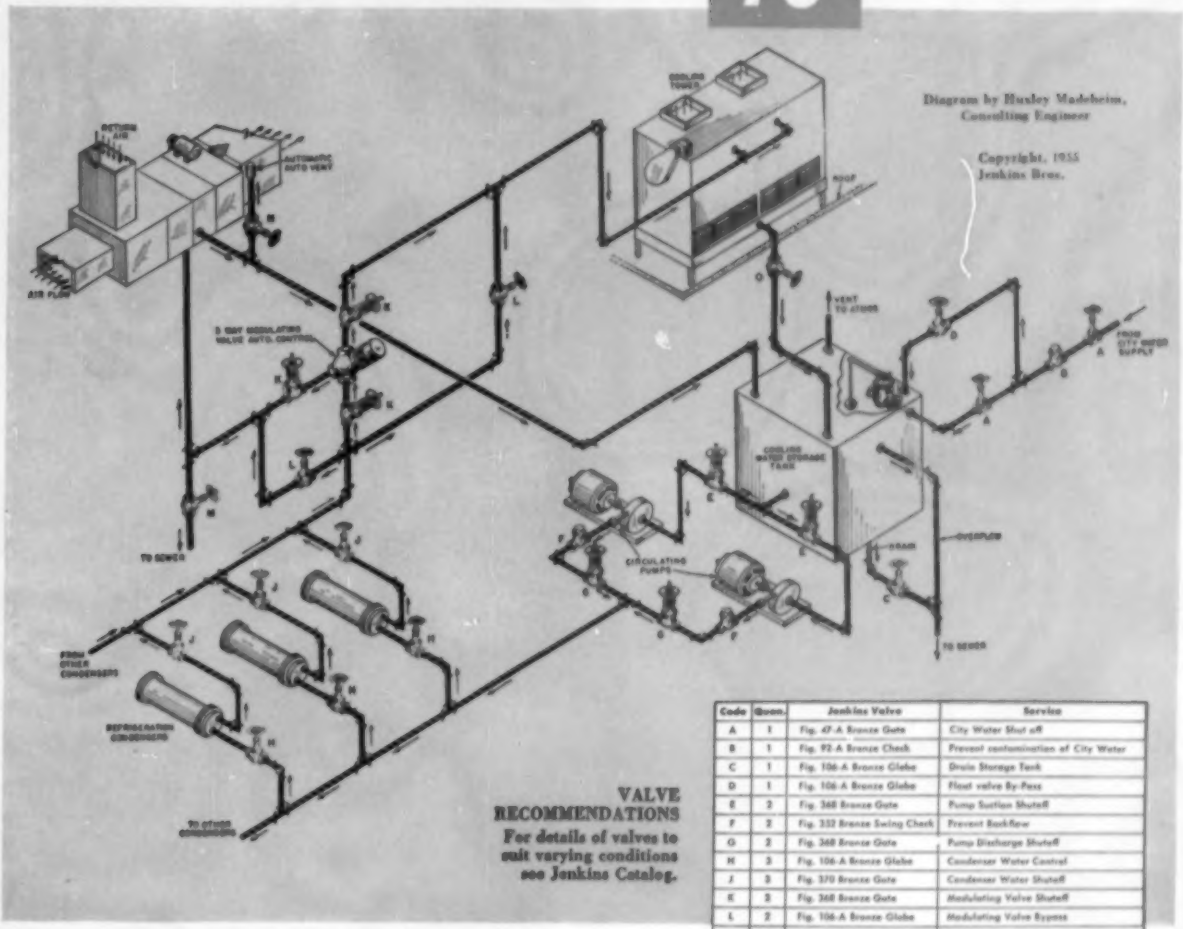

VALVE RECOMMENDATIONS
For details of valves to suit varying conditions see Jenkins Catalog.

Code	Quan.	Jenkins Valve	Service
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B	1	Fig. 92-A Bronze Check	Prevent contamination of City Water
C	1	Fig. 106-A Bronze Globe	Drain Storage Tank
D	1	Fig. 106-A Bronze Globe	Float valve By-Pass
E	2	Fig. 368 Bronze Gate	Pump Suction Shutoff
F	2	Fig. 332 Bronze Swing Check	Prevent Backflow
G	2	Fig. 368 Bronze Gate	Pump Discharge Shutoff
H	3	Fig. 106-A Bronze Globe	Condenser Water Control
J	3	Fig. 370 Bronze Gate	Condenser Water Shutoff
K	2	Fig. 368 Bronze Gate	Modulating Valve Shutoff
L	2	Fig. 106-A Bronze Globe	Modulating Valve Bypass
M	1	Fig. 106-A Bronze Globe	Drain Heating Coil
N	1	Fig. 106-A Bronze Globe	Vent Control
O	1	Fig. 106-A Bronze Globe	Cooling Tower Water Discharge Shutoff

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The cooling tower circuit provides for water storage in a tank inside the building to avoid freeze-ups. The water circuits shown can be full weight red brass pipe, copper tubing, or black iron pipe.

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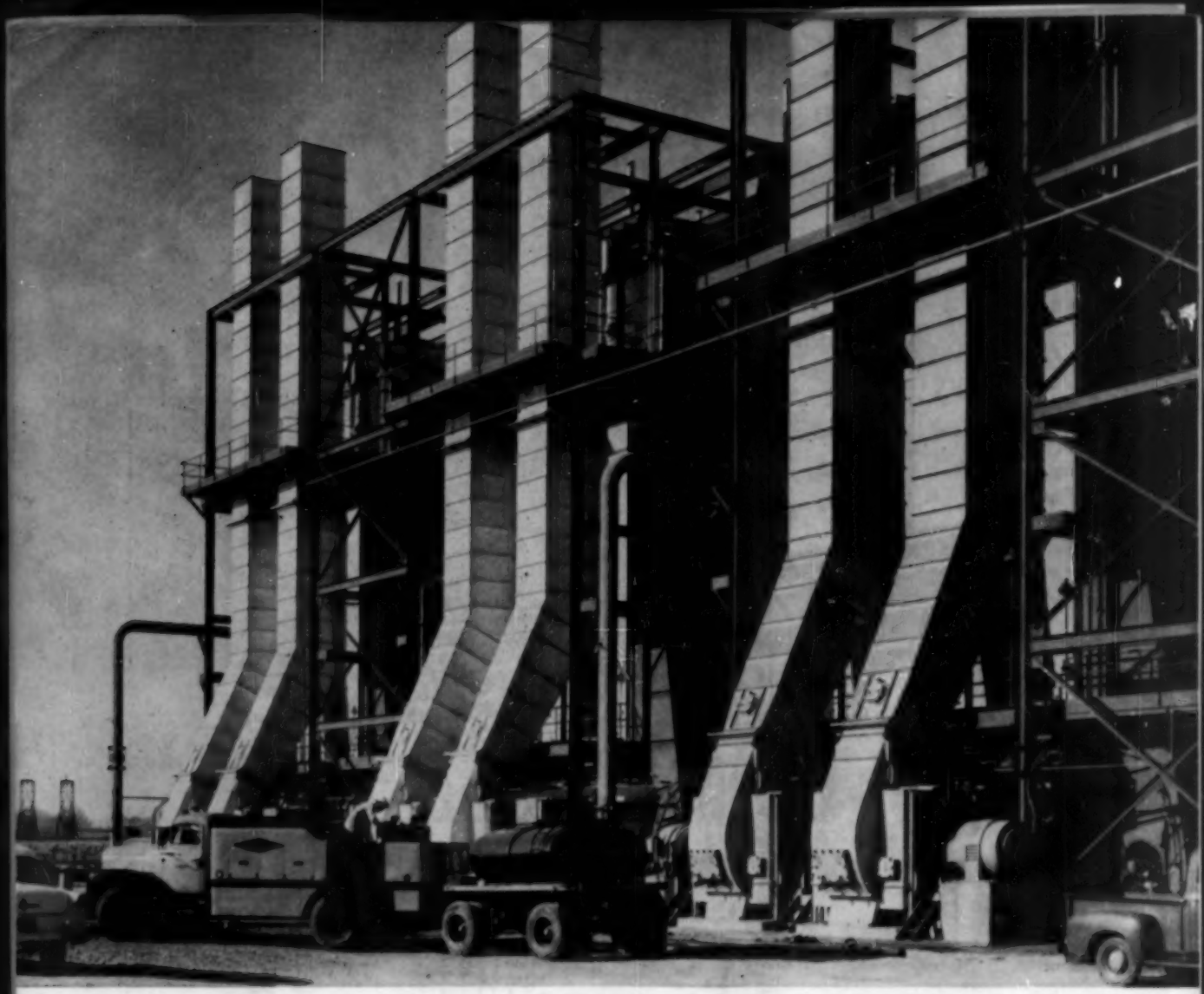

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